A PHYSICAL

DISSERTATION

ON

DROWNING:

IN WHICH

SUBMERSION, commonly called DROWNING, is ſhewn to be a long Time conſiſtent with the Continuance of LIFE, from a Variety of unexceptionable tho' ſurpriſing FACTS, related by the moſt eminent and judicious Authors, and confirmed by inconteſtable Evidence; which FACTS are reconciled and accounted for, from the ſtricteſt Laws of the Animal Oeconomy.

To which is ſubjoined,

The proper Meaſures for RECOVERY and RELIEF; the Obligations we lie under to practiſe them are clearly ſuggeſted, and ſtrongly enforced; intended for the Good of Mankind, by reſtoring Life to many Perſons who are erroneouſly ſuppoſed to be irretrievably drowned, ſuffocated or ſtrangled. Recommended particularly to the Conſideration of the Surgeons of the Navy and Army, who have frequent Opportunities of practiſing the Methods recommended, *&c.*

With an APPENDIX, containing ſome METHODS for the Recovery of thoſe who hang themſelves, and of Children ſuppoſed to be born dead.

By a PHYSICIAN.

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A DISSERTATION ON THE Recovery of Perſons drowned.

AS truth in general is of the laſt importance, not only in affording a noble and exalted ſatisfaction to the mind, but alſo in forming the morals, and, by that means, promoting the moſt valuable intereſts of ſociety; ſo nothing can a greater reproach to reaſon, nor a more palpable affront offer'd to its auguſt and venerable author, than that ignoble and unmanly turn of mind, commonly known by the name of *Credulity*, which is no more than an implicit contempt of reaſon, and all the mental powers, producing a propenſity to believe certain tenets, doctrines or facts, without that degree of evidence, which a mind ſtudious of truth ought to require.

But however odious *Credulity* may appear, when painted in her native colours, ſhe is nevertheleſs, if we may be allowed the expreſſion, a *ſpectre*, which haunts the various claſſes and diſtinctions of mankind, under a form ſo infatuating and alluring, as to ſeduce them from the plain and amiable paths of truth, and bewilder them in the dark and gloomy labyrinths of ignorance, error and confuſion. This deplorable obſervation is in no inſtance more effectually verified than in theſe very men, who profeſs a ſacred veneration for reaſon, and pretend to go wherever truth ſhall conduct them; for, we frequently find, not only antient, but

alſo modern philoſophers and phyſicians, labouring with a pompous ſhew of learning and ratiocination, to prove that nature, by her ſtated and eſtabliſhed laws, was capable of producing certain effects, which time has afterwards diſcovered never to have had any exiſtence, except in the imaginations of the credulous, or in the chimerical works of authors, who forſaking fact and nature, have given a full ſcope to their fancy and invention. Thus in former ages it was keenly diſputed, how it came about that a ſmall fiſh, called the *Remora*, was capable of putting a ſpeedy ſtop to a ſhip under full ſail; but this pretended fact has, by later and more penetrating naturaliſts, been diſcovered to be abſolutely falſe. And, no doubt, the ever memorable rabbit-woman of *Godalmin*, would have made a conſiderable figure in the annals of the *Royal Society*, and afforded matter to the members for copious diſſertations on the force of imagination, if ſhe had prudently ceaſed breeding a day ſooner. This bad piece of conduct has, however, thrown an almoſt irreparable diſgrace upon *natural knowledge*, by inducing the ſober and judicious part of mankind to imagine, that it was totally employed in explaining viſions and chimeras. Therefore, if we intend to philoſophiſe in ſuch a manner as not to diſgrace philoſophy, we muſt have facts duly aſcertained, before we attempt to explain and account for them; ſince, according to *Kercher*, in his *Mund. Subterran.* lib. 10. "'Tis as abſurd in phyſical mat-"ters, to philoſophiſe without experience, as it is for "a blind man to pretend to judge of colours."

Tho' from what has been ſaid, it ſufficiently appears, that *Credulity* is fatal to truth, yet we obſerve in the minds of ſome men, an arrogant and preſumptuous *Scepticiſm*, which, admitting nothing but what is eaſy to the conception of its poſſeſſors, is no leſs prejudicial to the genuine intereſt of ſcience and philoſophy; for, as by the former we are expoſed to the danger of adopting error as well as truth; ſo by the latter our minds are, as it were, manacled, and hindered from giving a rational aſſent to things and facts, cloathed with the moſt ſtriking and diſtinguiſhed characters

racters of evidence, for no other reaſon, than that we cannot comprehend them. It is, for inſtance, a culpable diffidence, to diſbelieve the poſſibility of a perſon's retaining a latent principle of life, after he has remained ſome hours, days, and even weeks under water, ſince numerous facts, related by the beſt authors, vouched by the moſt candid witneſſes, and recorded in the publick archives of the moſt penetrating and ſagacious nations, concur to remove the ſmalleſt remains of uncertainty in this point. Beſides, I would have the gentlemen of this claſs remember, that their conduct beſpeaks an inſupportable degree of pride, and amounts to a formal declaration, that they themſelves are bleſſed with geniuſes far ſuperior to others, ſince nothing can be true, but what is comprehenſible by the vaſt extent of their capacities. And tho' modeſty and common ſenſe ſhould not direct them to this obſervation, yet what the world calls *moral evidence* ſtands upon foundations too ſtable and ſure to be ſhaken by their frivolous conceits, or ill-grounded remonſtrances. In a word, the wiſe and thinking part of mankind will always be induced to give their aſſent to facts ſeen by a ſufficient number of witneſſes, who have ſenſe enough to guard againſt impoſture themſelves, and honeſty enough to ſay nothing but what is truth to their neighbours. All theſe advantageous circumſtances attend the following narrations, which, for the common benefit of mankind, have been collected from authors of the greateſt veracity, in order to ſhew, that there is often a poſſibility of reſtoring drowned perſons to life, after vulgar prejudice, and a want of ſufficiently extenſive views, with reſpect to the laws of the animal oeconomy, have laid a foundation for concluding them irretrievably dead, and paſt all hopes of recovery.

Dr. *Bruhier*, an eminent phyſician of *Paris*, well known to the learned world, and highly eſteemed for his knowledge in his profeſſion, about three years ago publiſhed a treatiſe on the *uncertain ſigns of death*, tending to prove, that many people are interred before

they are really dead; and that there are frequent inſtances of perſons who have lived many days without reſpiration, or any other apparent ſigns of life. This doctrine he eſtabliſhes by many inconteſtible hiſtories of people who have actually ſurvived their funerals, and lived many years after they had been buried, upon a ſuppoſition, that they were actually dead. Hence he very judiciouſly infers, that 'tis not imprudent but inhuman, to ſuffer the interment of our friends and relations, before we are convinced, from the moſt evident marks, that they are certainly and irrecoverably deceaſed; or till ſuch time as the beginning of putrefaction convinces us, that no hopes remain of a revival

In confirmation of what this celebrated phyſician has advanced, many examples might be found in our own country, which eſcaped his re ſearches; and, no doubt, it happens much more frequently than is generally imagined; eſpecially in hyſterical women, in thoſe who have contracted a habit of drinking ſpirituous liquors to exceſs, but particularly in thoſe who have been guilty (for ſo I can't forbear calling it) of taking frequent doſes of opium, or its preparations, ſo as to render life inſupportable without them, of which there are too many inſtances.

This doctrine, however true, is not altogether modern; for we learn from *Diogenes Laertius*, that the celebrated *Empedocles* acquired uncommon honour, by reſtoring a woman to life who was thought to be dead many days, and whoſe diſorder he diſcovered to be only a ſtrangulation of the uterus, that is, an hyſteric fit.

We learn, farther, that *Heraclides* of *Pontus*, a noted philoſopher, wrote a treatiſe on this very ſubject, which he intitled Περὶ τῦ ἄπνυ, *Of the diſtemper in which the patient is deprived of reſpiration.* In this he aſſerted, that the diſorder might continue thirty days, during which there was no reſpiration, or any other ſigns of life, without any marks of putrefaction; and that, notwithſtanding, the patient might at laſt recover.

In

In conſequence of the frequent interments of people they were really dead, Dr. *Bruhier*, in 1745, publiſhed a ſmall pamphlet, containing propoſals for the regulation of funerals, and the prevention of ſuch calamitous diſaſters, which he endeavours to have confirmed by the legiſlature; "for, ſays he, how many "women weary of their huſbands, and huſbands e- "qually weary of their wives; how many children "who have either a real or an imaginary reaſon to be "diſſatisfied with their parents; and, eſpecially, how "many covetous and neceſſitous heirs, who have "long waited for the happy moment, which was to "put him in poſſeſſion of an opulent fortune, may "not abuſe the liberty the law affords them of bury- "ing their friends at the end of twenty-four hours, "at which time they may, poſſibly, be really alive, "and capable of a recovery." And to prove this regulation the more neceſſary, he relates the following hiſtories.

A woman about eighty years old, being taken for dead, was about to be laid out as ſuch, when a perſon, who had peruſed his treatiſe, oppoſed the deſign. Next morning the woman was found recovered from her profound ſyncope, which, conſidering the intenſe cold of the ſeaſon, had probably proved a real cauſe of her death, had ſhe been taken out of her bed.

It is alſo ſufficiently known, that cardinal *Spinoſa*, firſt miniſter to the king of *Spain*, being ſuppoſed dead, and committed to a ſurgeon in order to be embalmed, thruſt away the hand which conducted the fatal inſtrument, which put a real end to his life: But notwithſtanding this accident, the barbarous ſurgeon proceeded to finiſh the operation.

But as Submerſion, or drowning, is the ſubject of our preſent enquiry, I ſhall only farther take notice of the hiſtories relating thereto.

The celebrated *Kunckel*, in *Ephemerid. Nat. Curioſ.* informs us, that a young man had the misfortune to fall from a Boat into the water, and ſunk to the very bottom, about fifteen hundred paces from the ſhore, which

which he did not reach till two hours after. However, as it is natural for perſons to give an account of the ſeveral circumſtances attending their reſpective ſtates of calamity and diſtreſs, the young man informed thoſe who had the curioſity to enquire into his condition during that time, that whilſt he was making the moſt ſtrenuous efforts to preſerve his life, he thought of nothing but God, and the means of recommending himſelf to his favour and acceptance; that the voice of his darling ſiſter, who wept bitterly on the ſhore, for the fate of her brother, had ſerved to conduct him to the land; that the diſturbance of the water by thoſe who ſought for him, and the lamentations of the people on the ſhore, were not only diſtinctly heard by him, but alſo proved extremely ſhocking and uneaſy to him; that he thought his reſpiration was carried on, without his knowing in what manner, that the water had not penetrated into any of the cavities of his body; and that he was hot inſtead of being cold.

The ſame judicious author informs us, that he had an opportunity of examining a fiſherman, who fell from a boat into the ſame place, and was, by means of the ice, kept under water for three days, but upon his being found, appeared full of vigour, ſaid that he enjoyed good health, and affirmed, that the moſt remarkable circumſtance of which he had been conſcious was, that a large bladder had been formed around his head for his preſervation.

The memorable accident which befel the *Swiſs Diver* is ſo well atteſted, and accompanied with ſuch a peculiar train of circumſtances, that it cannot fail to make the moſt lively impreſſions upon every perſon capable of the ſmalleſt degree of reflection. As neceſſity lays a foundation for induſtry, which frequently cannot be employed, but in a manner which is either prejudicial to health, or fatal to life, ſo this adventurous man followed the buſineſs of plunging into the water, and ſearching thoſe holes in which he imagined the larger and better ſort of fiſhes were lodged. Accordingly, being employed, as Dr. *Bru-*

hier

bier relates the ſtory, to furniſh a diſh of fiſh for a company, who intended to regale themſelves with a fine dinner, he cheerfully undertook the taſk. His employers, in the mean time, accompanied him to the brink of the river, and ſeeing him plunge into the water, retired, not in the leaſt doubting but he would keep his word. The *Swiſs*, however, happening not to bring the fiſh at the hour appointed, the company, when the afternoon was pretty far advanced, went to the banks of the river, in order to know the reaſon of their diſappointment. As the clothes of the diver lay on the river ſide, ſo they ſoon ſuſpected his deplorable fate, and accordingly ordered him to be ſearched for with hooks, in the place into which they had ſeen him plunge. The efforts for this purpoſe were not in vain, for he was at laſt found, and taken out of the water, tho' wounded in ſeveral parts.

As this unfortunate man had been under water for nine hours, ſo the curate of the place, whoſe profeſſion called for ſome care of a perſon in ſuch a ſituation, had a mind that he ſhould be forthwith interred; and he had been infallibly committed to the grave, had not the celebrated Mr. *Egly*, a member of the royal academy of *inſcriptions*, who obſerved a kind of ebullition in the water diſcharged from his mouth, poſitively affirmed that he was not dead. For that gentleman juſtly aſcribed this ebullition to the languid and imperceptible remains of reſpiration.

This conduct of Mr. *Egly*, however uncommon, yet made ſo deep an impreſſion upon the ſpectators, that they carried the unfortunate diver into an adjacent houſe, where having laid him out at full length, they compreſſed his abdomen, in order to procure a diſcharge of the water he had ſwallowed. By this means having in three quarters of an hour evacuated a conſiderable quantity of water, he moved one of his legs; a circumſtance which ſufficiently evinced that he ſtill retained ſome faint remains of life. For this reaſon he was, by Mr. *Egly*'s orders, wrapped up in warm ſheets, and gradually reſtored to a natural heat: Then being

being laid in a warm bed, and his life becoming gradually more conſpicuous, a liberal veneſection was made, which was ſucceeded by a ſigh, then by a ſlight knowledge of what had befallen him, and ſoon after by a total reſtitution of health; and tho' gratitude is rarely to be met with in the breaſts of the vulgar, yet this important ſervice ever after touched the heart of the *Swiſs*, with the higheſt and moſt lively ſenſe of the obligations he lay under to Mr. *Egly*.

Mr. *Durham*, a gentleman ſufficiently celebrated for his untainted integrity, and extenſive learning, in his *phyſico-theology*, quotes the following hiſtory from *Pechlinus*, an author of no leſs candour and reputation.

About eighteen years ago, a gardener of *Fronningholm*, now ſixty-five years old, and ſufficiently vigorous and robuſt for a perſon of that age, made a generous attempt to reſcue an unfortunate neighbour, who had fallen into the water; but being too fool-hardy, he ventured upon the ice, which broke, and let him fall into the river, which at that part was eighteen ells in depth: He went perpendicularly to the bottom, in which his feet ſtuck for ſixteen hours before he was found. He himſelf ſays, that he was no ſooner under water than he became rigid, and loſt not only the power of motion, but alſo all his ſenſes, except that of hearing, which was affected by the ringing of ſome bells at *Stockholm*. He, at firſt, alſo perceived a kind of bladder before his mouth, which hindered the ingreſs of the water by that paſſage, tho' it entered freely into his ears, and produced a dulneſs of hearing for ſome time after. This unfortunate man was in vain ſought for during ſixteen hours, at the end of which time he was taken up by means of an hook fixed in his head. and upon his total recovery ſaid, that he was ſenſible of that particular part of his fate. However, whether from the prevailing cuſtom of the country, or the perſuaſion of particular perſons, certain attempts were made in order to reſtore him to life: For this purpoſe he was wrapped up in blankets, leſt the air entering too precipitately

cipitately into his lungs, ſhould prove fatal to him. In this condition, being gradually warmed by means of ſheets, he was rubbed and ſtimulated till the motion of his blood, which had been checked for ſo many hours, returned. At laſt he was totally reſtored by means of cordials, and antiapoplectic liquors. He as yet bears the mark of the hook, and ſays, that he is ſtill ſubject to violent head achs. This ſingular accident, atteſted by the oaths of perſons who had been eye witneſſes to it, induced the queen to give him an annual penſion, and he was introduced to the prince, in order to give an account of what had befallen him.

The celebrated *Pechlinus* has wrote the hiſtory of a woman, who remaining under water for three whole days, was happily reſtored to life, almoſt in the ſame manner as the gardener. This fact was ſo notorious, that the learned *Tilaſius*, library-keeper to the king of *Sweden*, and in whoſe time the woman was ſtill alive, gave the following certificate of it, which is ſtill kept in the archives of the *Acad. Natur. Curioſ.*

There lately was in Dalia, *commonly called* Wormſland, *a woman of the name of* Margaret Larſdotter, *who having the misfortune to be thrice drowned, remained the firſt time, ſhe being then young, for three whole days under water, but the other two times had more ſpeedy relief afforded her. She died in* 1672, *in the ſeventy-fifth year of her age.* Telaſius.

Tho' this accident, and the delivery from it, happening ſo many different times to the ſame perſon, may by ſome be looked upon as fabulous and romantic, yet upon the whole it appears to be cloathed with the moſt genuine character of truth and evidence; for is it credible, that a man of probity, candour and learning, as we may readily ſuppoſe the librarian of a rich and powerful monarch to be, ſhould in a manner ſo poſitive and circumſtantial, dare to affirm a fact which was only ſuſpected, and much leſs one that was abſolutely

abſolutely falſe? Is it probable that a man of *Pechlinus*'s character, who is no leſs univerſally than juſtly applauded for his extenſive erudition and conſummate medicinal knowledge, ſhould compoſe an elaborate treatiſe in order to explain the poſſibility of this fact, without taking due pains to have its reality ſufficiently confirmed and aſcertained? Or, in a word, is it to be ſuppoſed that this phyſician, who was looked upon as the glory and ornament of the *Swediſh* nation, ſhould have the impudence to appeal to all the *Literati* of *Sweden*, for the truth of a fact, which had not the ſanction of ſufficient evidences? Why ſhould we be more ſcrupulous than *Pechlinus*'s contemporary authors, who have never called the truth of this fact in queſtion? The celebrated *Bartholin*, in *Act. Med. Haffn. Tom.* 3 *Obſ.* 42. ſpeaks of it in the following manner: "I can by no means remain diffident with reſpect to "the truth of a ſtory confirmed by the concurring "teſtimonies of ſo many witneſſes of candour and ve-"racity, and of which *Pechlinus* has demonſtrated "the poſſibility by other examples of a ſimilar nature. "I am only ſurpriſed, that ſo ſingular a narrative "ſhould be ſo long buried in oblivion, in a nation o-"therwiſe ſo curious and fond of diſcoveries."

But we ſhall have no manner of reaſon to doubt of this fact recorded by *Pechlinus*, when we reflect, that other celebrated phyſicians and philoſophers, aſſure us of the truth of other accidents highly ſimilar and analagous to it. Thus *Alexander Benedictus*, lib. x. cap. 9 ſpeaks in the following manner: "Life has "been frequently ſeen reſtored to perſons who have "remained under water during forty-eight hours." The ſame author, for this very reaſon, thinks it highly improper, to inter drowned and hyſteric patients, till ſeventy-two hours after their ſuppoſed death.

Borelli, in *Cant.* 2. *Obſ.* 2. informs us, that "a "certain perſon of diſtinction having remained for a "long time under the water, was taken for dead "when he was found; but proper efforts being made "to reſtore his life, he was rouſed from his ſuppoſed death;

" death, and long ſurvived his misfortune." Beſides, the credibility of the fact, told by *Pechlinus*, is ſufficiently confirmed by the ſuffrage of the learned and judicious *Zacchias*, who, in his 79th conſultation, wrote in order to determine, Whether the return of life to a young man, who had remained an hour under water, was miraculous, and, as ſome ſuperſtitious people would have it, to be aſcribed to a perſon of ſuperior ſanctity, ſpeaks in the following manner: " This event is ſo far from being miraculous, that it " can hardly come under the denomination of ſurpri- " ſing, ſince vaſt numbers of perſons have returned " to life, after having been drowned, or ſuffocated in " any other manner, not only for ſome hours, but " alſo during one, and even three whole days; be- " cauſe the ſuppreſſion of reſpiration in the water, " had occaſioned an oppreſſion of the ſpirits, and had " brought on an apoplectic paroxyſm, which render'd " them apparently dead, tho' their lives were really " preſerved by tranſpiration, which augmenting gra- " dually, laid a foundation for a free reſpiration."

The poſſibility of retaining a principle of life for a long time under water, is ſtill more ſurpriſingly confirmed by *Kunckel*, in *Miſcellan. Nat. Curioſ. Decad.* 3. *An.* 5 & 6. *Obſ* 71. where he ſpeaks in the following manner: " I am ſufficiently ſenſible, that in " *Sweden*, no one doubts of the poſſibility of retain- " ing life under water for eight days; and that the " following accident is by no means called in queſtion " by thoſe who live near the place where it happen- " ed. Some time ago, about four leagues from the " town of *Falung*, a painter fell from a boat into the " water, in ſuch a manner as to remain upright with " his feet at the bottom: He was in vain ſearched " for during eight days, at the end of which time he " appeared alive on the ſurface of the water. The " magiſtrate and clergyman of the place, aſked him " the following queſtions: Whether he had reſpired " during all the time of his ſubmerſion? To which " he anſwered, he knew nothing of the matter. " Whether he had thought upon God, and recom-

" mended his ſoul to him? To which he replied,
" Very often. Whether he could ſee and hear? To
" which he anſwered, Yes; and ſaid, that he would
" often have laid hold of the hooks employed in find-
" ing him, if he could have moved his arms. He
" alſo added, that the fiſh proved highly offenſive
" and uneaſy to him, by the attacks they made on
" his eyes; and being aſked by what means he guard-
" ed againſt theſe attacks, he anſwered, by moving
" his eye lids. As to his ſenſe of hearing, he affirm-
" ed, that nothing was more ungrateful, and even
" painful, to him than ſtriking the ſurface of the
" water; and that, in a particular manner, he was
" affected with a violent pain of his ears, which was
" forthwith communicated to his whole body, every
" time people came to draw water in buckets. When
" he was aſked, Whether he had been ſenſible of
" hunger, and diſcharged his excrements? He repli-
" ed, that he had not. Being interrogated, Whe-
" ther he had ſlept? He anſwered, he knew nothing
" of it, but believed he had, becauſe he was ſome-
" times deprived of all ſenſation and reflection; add-
" ing, that all the thoughts he remembered to have
" paſſed in his breaſt had only God, and the means of
" his own deliverance, for their objects."

The nature and circumſtances of the accident now related, lay a ſufficient foundation for our believing the following memorable event, eſpecially as it happened to a perſon of diſtinction, and is atteſted as authentic by men of learning and probity.

Gocellinus, a young man, and nephew to one of the archbiſhops of *Cologne*, had the misfortune to fall into the *Rhine*, and was not found for fifteen days after; and being laid in an adjacent church, in order to be interred, ſoon returned to life, and ſurvived the accident a long time.

As there are a great many ſecret things in nature, and probably numberleſs latent circumſtances in the animal oeconomy, with which we are entirely unacquainted; and as perſons of a curious and attentive turn of mind, daily obſerve accidents, which they

before

before thought impoſſible, ſo we have no reaſon to doubt of ſurpriſing facts, related by men of learning and candour, nor formally to deny the truth of events which at firſt appear incredible. Of this kind is the following narrative.

The celebrated Mr. *Burmann* aſſures us, that in *Boneſs* of *Pithovia*, he heard a funeral ſermon preached upon the death of one *Laurence Jones*, a man of ſeventy years of age, who, as the preacher ſaid, was drowned when ſixteen years old, and continued ſeven weeks under water, notwithſtanding which he returned to life, and enjoyed good health. However viſionary and romantic this accident may appear, in the eyes of thoſe who pretend to have diveſted their minds of vulgar errors, yet it has met with credit from the moſt penetrating and ſagacious authors who lived at the time in which it happened. Thus the learned and judicious *Langelott*, in *Miſcellan. Natur. Curioſ. Decad.* 1. *An.* 6. *Obſ.* 20. not being able to conceive how a perſon can preſerve a principle of life ſo long, without the aſſiſtance of the air, in waters ſo cold and full of nitre as thoſe of *Sweden*, and not being ſatisfied with ſimilar accidents daily happening to ſome birds and inſects, is yet ſo far from doubting the truth of this accident, that he applies to the learned members of the *Acad. Natur. Curioſ.* for their opinion and explication of it; by which means he imagined, that effectual meaſures for reſtoring many drowned perſons might be diſcovered. Beſides, it is by no means probable, that a man of Mr. *Burmann*'s veracity would forge ſuch a ſtory, in order to ſee what enormous lengths credulity was capable of carrying his fellow creatures; nor is it poſſible that the clergyman ſhould, from the pulpit, aſſert this fact as true, if it had not been really ſo, ſince *Laurence Jones* was a native of the place, and well known to every one of his audience.

But upon the whole, granting that this narrative of *Laurence Jones* was falſe, which however we have no reaſon to belive, yet the recital of it has a great tendency not only to illuſtrate our ſubject, but alſo to

produce happy effects in life; for, 1ſt, it is certainly the genuine and uncontroverted intereſt of the public, to be apprized of the poſſibility of a perſon's retaining a principle of life for a long time under water; 2dly, The coucluſion to be drawn from this ſeemingly miraculous effect, is, that if after a long time a body is taken out of the water, without the ſigns of putrefaction, it is the duty of thoſe who find ſuch a body, to treat it as if there were ſtill a poſſibility of reſtoring it to life; and, 3dly, If it is certain, from uncontroverted facts, that perſons have retained life under water for ſeveral days, there is no reaſon, from the laws of the animal oeconomy, and the hitherto known properties of the animal fluids, to diſbelieve that the like ſhould alſo happen to perſons who have alſo remained under water for ſeveral weeks.

As our modeſty ought always to be proportioned to the difficult and intricate natures of the ſubjects we pretend to conſider, ſo we frankly acknowledge, that theſe and other ſimilar accidents, as it were, bewilder the mind, and perplex the moſt penetrating capacities, when they attempt to account for them; ſince we have never yet diſcovered wherein the conſtituent principle of life exactly conſiſts, and ſince there are various properties both of the ſolids and fluids of the human body, to which we are entire ſtrangers. Some, however, affirm, that a principle of life may, in the deplorable ſtate of ſubmerſion, be retained for a long time, becauſe the coldneſs of the water renders the circulation ſlower, and ſuppreſſes the tranſpiration of the vital air contained in the blood; whilſt, at the ſame time, ſome portions of the air lodged in the water probably penetrate into the bodies of ſuch perſons. But *Platerus* and *Bartholin* ſeem to account in a more rational and ſatisfactory manner for phænomena of this kind. The former of theſe authors, in explaining how a woman, who was drowned in the *Rhine*, for murdering her own child, returned to life after ſhe was found, affirms, that this accident was the effect of a ſyncope, in which reſpiration and the motion of the Heart are ſtopped. Now it is certain from experience

and

and obſervation, that theſe two functions may be ſuppreſſed without the actual loſs of life, as is frequently obvious in violent ſyncopes, and hyſteric paroxyſms, from which the patients do not often recover in an hour or more; during which time the ſlighteſt indications of life, by the pulſe and reſpiration, are not to be obſerved.

If any one ſhould ſay, that it beſpeaks an unpardonable exceſs of credulity, to believe that a ſyncope may laſt for a week or longer, and that conſequently the motion of the heart and pulſe may be for that time ſuſpended without neceſſarily producing death; we may juſtly reply, that hitherto no perſon has diſcovered wherein the eſſence and principle of life conſiſts, and that there are in nature various phænomena which ſeem to prove, that the motion of the heart, and the circulation of the humours, are rather palpable ſigns of the exiſtence of life than its proximate and immediate cauſes. This doctrine we ſhall endeavour to eſtabliſh in a ſtrictly analogical manner, by comparing thoſe events which happen to vegetables, and the brute creation, with ſimilar accidents which befal mankind.

For this purpoſe we ſhall firſt conſider the ſtate and condition of ſuch plants as retain a principle of life and vegetation during the whole winter. All the difference, according to *Pechlinus*, between theſe and the plants of the animal kind, is, that in the latter the principle of motion is weaker, and the texture of the fibres leſs firm; whereas the former contain a much larger quantity of oil, and have the ſpirit ſubſervient to their vegetation repelled by the cold, to the bulbs, roots and ſeeds, where it circulates in a languid manner, without having force to propel buds, flowers and bloſſoms, till the kind and genial heats of the ſpring render it more powerful and active. Why may we not, therefore, ſuppoſe that ſomething analagous to this may happen in ſome human bodies, who have been under the water for ſome time.

This is not the only inſtance in nature which we can bring in confirmation of our doctrine; for certain inſects paſs the whole winter in *chryſalides*, or conſiderably hard pellicules, without diſcovering the ſmalleſt ſigns of life; tho' it is certain they are not dead, ſince a ſmall degree of heat only is requiſite to produce their laſt metamorphoſis. The reaſon of this apparent death, is the cold of the atmoſphere, ſo inſpiſſating their fluids, as that they can only circulate in a faint and languid manner, round an highly minute and ſmall center. The degree of fluidity which they retain is, however, ſo conſiderable, that a more intenſe cold than we perceive on the earth, is incapable of totally coagulating them, as is ſufficiently evinced by the curious experiments of Mr. *Reaumur*.

This phænomenon is not only obſerved in the *chryſalides* of inſects, but the *ſeminal principle* is alſo preſerved free from coagulation, and without diſcovering the ſmalleſt ſign of life, in eggs, which may be conſidered as the *chryſalides*, or pellicules of animals, whoſe life is perceptible. Aquatic inſects, alſo, plunge themſelves into the mud, where they remain without motion till the ſpring; which holds equally true of frogs and toads, according to *Valentinus*, in *Diſſert. Epiſtol*, 4.

The like happens to ſome terreſtrial inſects; for Mr. *Reaumur* has, by experiment and obſervation, ſufficiently evinced, that ants, during the whole winter, remain apparently dead, till the approach of the ſpring.

A third and more powerful collateral proof of this doctrine, is drawn from the conſideration of ſome animals, whoſe blood is warm, and circulates in the ſame manner with that of the human ſpecies; ſince in theſe alſo the circulation and reſpiration are ſuppreſſed during the winter, but return in the ſpring

Thus of ſwallows it may be ſaid, that during one half of the year they are dead, and the other alive. *Olaus Magnus* and *Schæffer*, in a letter wrote to *Hevelius*, affirm, that in ſome northerly countries, it is very

very common for fiſhermen to find in the water large cluſters of ſwallows, which in the beginning of autumn had thus piled themſelves up. Thoſe authors alſo inform us, that ſome ſpecies of ſwallows ſpontaneouſly ſeek a refuge in the waters, others take their flight to foreign climates, others conceal themſelves in the holes of old and decayed buildings, in the ſand, and in their own neſts; and that others, finding a decay of ſtrength in their paſſage to other countries, plunge themſelves into the ſea, where they remain till the genial ſpring rouſes their latent principle of life and motion.

The celebrated *Kircher*, in *Mund. Subterran* lib. 8. ſect. 4. informs us, that the inhabitants of *Peloponeſus*, and other territories of the *Archipelago*, have told him, that every year they obſerved large quantities of ſtorks and ſwallows flying thro' their countries, from *Egypt* and the coaſts of *Lybia*; and that theſe latter, when fatigued with flying, placed themſelves, to the number of five or ſix, on the back of a ſtork, whom they recompenſed by an uninterrupted and melodious ſong. There are, therefore, continues the author, ſome ſwallows which fly from one country to another; but it is equally certain, from experience, that the ſwallows of cold climates make no ſuch voyages, but during the winter conceal themſelves in caves, lakes, rivers, ſeas, and the cavities of trees.

Olaus Magnus, in lib. 15. cap. 10. informs us, that ſuch ſwallows as are taken out of the water before the due time, do not live long; and adds, that the inhabitants of *Tivoli*, when ſhewing him mount *Sciſſo*, which name it receives from a fooliſh report of its being divided at the crucifixion of our Saviour, aſſured him, that in the winter ſeaſon large quantities of ſwallows, apparently dead, were to be found on it; whereas no ſuch animals are to be found there in ſummer. He then quotes *Cyſatus*, who in his deſcription of *Switzerland* affirms, that about *Chriſtmas* ſome workmen, when digging up the earth for laying the foundation of a public edifice, found a ſubterraneous cave, from which flew about twenty or more ſwallows,

lows. Whence the author concludes, that all theſe birds do not paſs the ſea at their diſappearance, but that ſome retire into cavities of mountains, others in hollow trees; but that this moſt frequently happens in northerly climates.

Fortunus Licetus, in *Tr. de Feriis Altric. Animal. Diſp.* 19 affirms, that in upper *Poland* every perſon may be experimentally convinced, that the ſame ſwallows which in ſummer build their neſts upon the tops of houſes, towards the end of *September* plunge themſelves into ditches and rivers, where they remain concealed till about the middle of *May*. He alſo informs us, that when the inhabitants ſeeing fiſh thro' the ice, break it in order to catch them, they alſo frequently find cluſters of ſwallows adhering to each other, without diſcovering the ſmalleſt ſigns of life, till they are brought to a ſtove, where they ſoon return to life. But what is ſtill more remarkable, is, that as ſoon as the *Polanders*, who imagine it unlawful to kill theſe ſwallows, ſet them at liberty, they forthwith fly back to the water, and plunge themſelves into it.

The celebrated *Huett*, archbiſhop of *Avranches*, who travelled thro' *Sweden*, informs us, that between *Caen* and the ſea, along the ſhore of the river *Orne*, there are many caves, in which, during the winter, have been found large cluſters of ſwallows, ſuſpended like ſo many bunches of grapes; and that the like was long ago obſerved in *Italy*: For *Pedo Albinovanus*, in the elegy he compoſed on the death of *Mecænas*, ſpeaks of the retreat of the ſwallows to the rocks, as an infallible ſign of the approach of winter.

" Congelantur aquæ, ſcopulis ſe condit hirundo.
" Verberat egeledas garrula vere lacus."

Bodin, quoted by *Camerarius*, *Cent.* 7. *Hiſt.* 71. informs us, in his ſecond book of the *Theatre of Nature*, that when the people who inhabit the coaſts of the *Baltic* ſea, are employed among the rocks in ſearching for yellow amber, they frequently find large cluſters

cluſters of ſwallows. *Camerarius* ſubjoins, that ſome authors affirm, that "ſwallows conceal themſelves in "the bottom of the ſea, where they ſleep till the "appearance of a proper ſeaſon for their quitting it; "but this is impoſſible ſince they have lungs, and for "that reaſon muſt neceſſarily periſh in ſuch a condition." But however ſpecious and concluſive this reaſoning of *Camerarius* may appear, yet 'tis certain, that the truth of facts, which have actually happened, can never be invalidated.

Franciſcus de Frankenau, in his medicinal ſatires, confirms this opinion with reſpect to ſwallows, by the authorities of *Lauremberg*, in *Acer. Philol.* lib. 3. cap. 71; of *Iſaac Voſſius*, in his *Append. de Lucis Natur.* cap. 1; of *Deuſingius*, in *Vindict. Fæt.* ſect. 5; and of *Fournier*, in his geography, who, in part 1. lib. 2. cap. 5. informs us, that they are commonly found in the *Norwegian* ſeas, as alſo in the lakes and rivers of *Sileſia*, *Poland*, *Bohemia* and *Moravia*; and that in the beginning of the autumn large numbers of them plunge themſelves into wells. The ſame author, alſo, eſtabliſhes his own opinion by the additional ſuffrages of *Cromerus*, in *Hiſt. Polon.* lib. 1; of *Hevelius*; of *Marcellus Donatus*, in *Hiſt. Med. Memorab.* lib. 4. cap. 12; and of *Helvicius*, in his epigrams.

The celebrated Mr. *Falconet*, whoſe judgment and veracity render his ſingle word a ſufficient evidence, informs us, that being in the houſe of a gentleman of *Breſt* in the winter ſeaſon, he ſaw a ſervant bring in a kind of maſs or lump, which appeared to be earth, and which ſome fiſhermen had caught in their nets: By waſhing it carefully, in order to diſcover what it was, it was found to be a group of ſwallows, which reſumed life, by being expoſed to the fire for ſome time.

Swallows are not the only birds which conceal themſelves in the bottoms of rivers, in order to paſs the winter; for *John Baptiſte de Fulgoſa*, formerly doge of *Genoa*, affirms, that *Gervas Tilleſerius* wrote to *Otho* the fourth, that ſome perſons having thrown

their

their nets into a river of that country in the winter time, they brought to land a large quantity of ſtorks, which were apparently dead, with their beaks fixed in each other's fundament; but they were ſoon reſtored to life, by means of heat. The ſame author adds, that in 1467, near *Metz* in *Lorrain*, a large number of apparently dead ſtorks were found in a river, and that being put into a warm bath they recovered life.

The learned *Voſſius*, in *Append. de Lucis Natur.* informs us, that at the approach of winter ſtorks, herons, and ſome other birds of the like nature, do not fly to *Egypt* or into more temperate climates, but plunge themſelves into ditches and marſhes.

The poſſibility of retaining life for a long time under water, is ſtill farther evinced, by conſidering thoſe birds with which our fields and foreſts are richly ſtocked in ſummer, but which are not to be ſeen in winter. If it ſhould be ſaid, that theſe, during the winter, live upon the ſtores they have amaſſed in the ſummer, I anſwer, that they are by no means provident againſt future want. Hence they muſt neceſſarily conceal themſelves, in places ſuited to their particular natures; and as it is equally impoſſible for them, as for the human ſpecies, to live awake without aliments, 'tis more than probable that during the whole winter they are, as it were, locked up in ſo lethargic a ſleep, that they ſuſtain no loſs or diſſipation of their fluids, and conſequently require no reparation.

If it ſhould be aſked, Whether theſe animals, during ſuch a ſtate, retain a real principle of life? I anſwer, that the thing is not only probable, but may be alſo evinced from fact and experience; ſince the moſt celebrated natural hiſtorians and phyſicians give us ſtrong and uncontroverted inſtances of this kind. Thus in *Ephemerid. Nat. Curioſ.* we are informed, that a certain gentleman, in the winter ſeaſon, ordered an hollow trunk of a ſallow tree, which by his direction had been cut down the preceding autumn, to be laid on the fire; but a ſmall portion of it happening to be left in a corner of the room, he had the curioſity to examine

examine it, and upon his doing ſo, found feathers arranged and diſpoſed in a natural manner: Theſe he gently plucked off, and underneath found the fleſh of a ſmall bird, which he believed to be dead, tho' he could not diſcover to what ſpecies it belonged. However, with reſpect to this circumſtance, he was ſoon undeceived; for having expoſed it to the influence of the fire, it ſoon diſcovered palpable ſigns of life. Something ſimilar and analagous to this, no doubt, happens with reſpect to many of thoſe quadrupeds which inhabit our foreſts, for want of a nouriſhment proper to give their blood that degree of fluidity which is abſolutely neceſſary to its circulation, ſince it is certain, that a far ſmaller number is to be ſeen in winter than in ſummer.

After theſe examples of an apparent death in birds whoſe blood is warm, we have no reaſon to be ſurpriſed at *Pechlinus*, when he affirms, that in the winter time, fiſhes not only appear dead, but are conſequently covered over with a cruſt of ice in their holes, without having the vital principle deſtroyed in them; for they begin to live afreſh when the heat of the atmoſphere, or an artificial fire, melts the ice. The like continues the author, happens to ſerpents, toads, frogs, tortoiſes, and in a word all amphibious animals, when the cold inſpiſſates their juices; which being naturally viſcid, are conſequently more proper to prevent the diſſipation of that vital ſpirit, which is abſolutely neceſſary to reſtore them to life.

'Tis to be obſerved, that thoſe fiſhes which have been thus frozen, do not long ſurvive their artificial reſtitution to life; becauſe the froſt having altered the principles of their blood, the vital ſpirit, when beginning to act and unfold itſelf, can no longer form a maſs of fluids of an uniform nature. Thus wine when frozen, and artificially thawed, contracts a diſagreeable flavour, becauſe the ſolution being procured in an unnatural manner, hinders the ſpirituous part of the wine from mixing with its other principles, in the ſame order and proportion as before.

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What *Pechlinus* advances with reſpect to fiſhes, is entirely conformable to the opinion of *Theophraſtus*, in *Tr. de piſcibus in ſicco degentibus*, where we are informed, that the inhabitants of *Pontus* frequently find fiſhes in the ice, which diſcover no ſigns either of motion or ſenſation, till they are put into a fiſh back, or laid among ſtraw. This circumſtance, according to *Theophraſtus*, happens particularly to the gudgeon, and ſome other fiſhes of a ſimilar nature.

The laſt proof of the poſſibility of a perſon's retaining a principle of life for a long time under water, without a ſupply of aliments for the purpoſes of nutrition, is drawn from a conſideration of ſome quadrupedes, as the hedge-hog, the marmotte, the dormouſe, and ſome others, which in the beginning of winter concealing themſelves in the earth, are ſeized with ſo profound a ſleep that they appear to be dead, ſince neither the pulſation of their arteries, nor their reſpiration are perceptible. This circumſtance, no doubt, induced the celebrated *Harvey*, in *Lib. de Generat. Animal. Exercit.* 50. to ſpeak in the following manner. "Some ſanguineous animals live long without any "pulſe, and lie concealed during the whole of the "winter, notwithſtanding which they remain alive, "tho' their heart retains no motion, and their reſpi- "ration ſtops, juſt as it happens to perſons attacked "with ſyncopes and hyſteric fits, whoſe pulſe is to- "tally aboliſhed." Tho' *Harvey* was the glorious diſcoverer of the circulation of the blood, and may for that reaſon be ſuppoſed to be a keen advocate in its behalf; yet it is ſufficiently obvious from this paſſage, that he did not believe it abſolutely neceſſary to the preſervation of life. But *Pechlinus*, whether from prejudice, or rational deductions from what he had obſerved, is of opinion, that in theſe animals reſpiration is carried on, by a motion of the diaphragm, ſo inſenſible as to eſcape the eye of the obſerver. He alſo obſerves, that in this ſtate, it is neceſſary their reſpiration ſhould be ſuch; becauſe if it was performed in the uſual manner, the motion of the blood would be ſo likewiſe; in conſequence of which, the tranſpiration and neceſſi-

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ty for aliments would be equally ſtrong; a circumſtance incompatible with the condition of theſe animals which lie hid under the earth during the whole winter,

Tho' theſe relations may poſſibly appear very ſingular and ſurpriſing, to perſons unacquainted with natural hiſtory, yet they infallibly prove, that in the brute creation at leaſt, reſpiration, the circulation of the blood, and pulſation of the arteries may ceaſe for a long time, without the total extinction and deſtruction of life. Now is it not highly probable, or rather abſolutely certain, that ſomething ſimilar and analogous to this may happen to human creatures, who have the misfortune to be drowned, ſince in both the ſolids and fluids act and move by the ſame laws, ſo in both ſuffocation muſt be the ſame thing, and conſequently its effects removed by the ſame means?

Beſides, there is by no means any reaſon for believing, that an inſtance of this ſurpriſing abſtinence and want of food, produced by ſuch a profound and lethargic ſleep, as that of the marmotte, is not to be found among the human ſpecies; for in *Miſcellan. Acad. Natur. Curioſ. An.* 8. *Obſ.* 67. the celebrated *Ludovicus*, firſt phyſician to the duke of *Saxe-Gotha*, informs us, that a young girl, who for ſome fault ſhe had committed, being apprehenſive of a ſevere chaſtiſement from her parents, retired to the moſt concealed part of a thicket, where, ſeven days after her elopement, ſhe was found lying on her belly, with all the apparent ſigns of death, except that her limbs were ſtill flexible and pliant; her viſage was overſpread with a viſcid phlegm, which was covered with an hoary kind of down, and with the falling leaves which had adhered to it: Her mouth and noſtrils were entirely full of a thick mucus. But notwithſtanding theſe ſeemingly diſcouraging circumſtances, the phyſician called to her aſſiſtance, ordered her body to be warm'd by means of friction; then, with warm water, waſhing away the phlegm which covered her face, and the viſcid mucus which obſtructed her mouth

and noſtrils, he poured into her mouth a ſpoonful of brandy, which ſeemed to go down her throat, and was the only cordial he had at hand. Upon exhibiting a ſecond ſpoonful ſhe fetched a ſigh, and a third made her open her eyes.

We now proceed to conſider the moſt proper and efficacious meaſure to be taken for the relief of drowned perſons; for which purpoſe we ſhall previouſly inveſtigate and aſcertain the genuine cauſe of ſuffocation.

Not only the antient ſchools of *Greece* and *Arabia*, but alſo moſt of the ſucceeding phyſicians, till the days of *Platerus*, imagined that the ſuffocation was produced by the water which entered into the ſtomach, breaſt and lungs; in conſequence of which falſe notion they thought themſelves fully authoriſed to attempt its diſcharge with all poſſible expedition. For this purpoſe they ordered drowned perſons to be ſuſpended by the feet, or laid upon their bellies, on a hogſhead or tub, which was to be agitated from one ſide to the other, imagining that by this poſition, the abdomen and breaſt being compreſſed, and the head hanging down, the agitation of the veſſel muſt neceſſarily facilitate the evacuation of the water, which they ſuppoſed was alſo favoured by the declining ſituation of the ſuperior part of the body. With the ſame intention, they alſo ordered ſuch meaſures as had a tendency to excite vomiting.

But as a falſe theory never fails to lay a foundation for a dangerous practice, ſo we have juſt reaſon to condemn this method of ſuſpenſion, or hanging by the heels; for the water ſwallowed by drowning perſons deſcends into the ſtomach, and not into the thorax, ſo that it cannot prevent their recovery. This circumſtance muſt happen, not only ſo long as a perſon retains a ſenſe of his ſtate and condition, but alſo afterwards; for as the water is hindered from entering into the arteria trachea and lungs by a mechanical effort, in which reaſon has no ſhare, ſo the lungs may in this ſtate be compared to an empty bottle plunged in water, into which the fluid does not enter, becauſe

the air it contains reſiſts its acceſs, and this the rather happens, becauſe the motion of the breaſt, deſtined to attract the air, at that time, totally ceaſes, and conſequently nothing forces the water to enter and fill up its place. This doctrine is not only evinced from the ſtructure of the parts, but alſo confirmed by experience.

Thus the learned *Platerus*, in *Queſt.* 5. poſitively affirms, that if drowned perſons ſwallow any water, the quantity of it is too ſmall to prove mortal to them; becauſe he always found but very little of it in their ſtomachs. He alſo adds, that moſt of the water which appears to be diſcharged from the mouths of perſons ſuſpended by the heels, really flowed from their cloaths.

Nymman, in *Tr. de Vita Fœt. in Utero*, ſpeaks thus, "Who could believe that a fœtus ſo long included in "the uterus, where it moves all its limbs, ſhould yet "never move its jaw bone, nor open its mouth. Be"ſides, it always has its noſtrils open, notwithſtand"ing which it has never been obſerved that the li"quor of the amnios has entered its body. Thus "it is with the human fœtus, as with thoſe who "are drowned, ſince in diſſecting many of theſe "laſt, I have hardly found a pint of water in their "bodies."

In the *Miſcellan. Nat. Curioſ. An.* 2. *Obſ.* 251. *Wepfer* gives an account of the anatomy of ſome beavers, one of which was drowned. The author having opened the *arteria trachæa*, no water was diſcharged from the lungs; but there were about four ounces of water, like the waſhings of fleſh, found in the right cavity of the breaſt, and about three ounces of the ſame kind in the left. This extravaſation, the author juſtly ſuppoſes, produced by the expreſſion of a bloody lymph, from the pores of the bronchia of this animal, which had for a long time ſtruggled againſt ſo violent a death as that of drowning. Neither pure water, nor water tinged with blood, were obſerved either in the *arteria trachia* or in the *bronchia*.

Bhonius, in the appendix to his treatiſe *de Renuntiat. Vuln. Diſſ.* 2. informs us, that in diſſecting a great many women, drowned for murdering their children, he had ſhewn the ſpectators, that there was little or no water in their lungs and abdomen; and adds, that in order to render himſelf more certain with reſpect to this circumſtance, he had drowned ſeveral animals, in whoſe cavities, tho' drowned alive, he had never perceived any water.

Detharding ius, at preſent profeſſor of medicine in *Copenhagen*, in a letter wrote when he was profeſſor at *Roſtoch*, in 1714, gives us an account of the diſſection of a ſoldier, who attempting to make his eſcape from a garriſon, was drowned in a ditch, and, upon being opened, had in his ſtomach only about a pint of beer, which he had drank ſome time before. The profeſſor took care previouſly to apprize the ſpectators, that there would not be a ſingle drop of water in his breaſt, which, as well as his abdomen, was very much elevated; and the event verified the prediction.

Johannes Conradus Becker, in his treatiſe *de Submerſ. Mort. Sin. Pot. Aq.* gives us the four following hiſtories A dog, ſays he, being drowned, and lying in the water for an hour, his abdomen, ſtomach and inteſtines appeared tumified and inflated, tho' a ſingle drop of water was not found in them. The lungs were alſo inflated, without containing water, like thoſe of hanged perſons, but immediately collapſed upon ſuffering the air to eſcape thro' an inciſion made in the *arteria trachæa*. The author ſubjoins, that this obſervation rendered the doctrine of the antients highly ſuſpected by him.

The ſecond is the hiſtory of a peaſant, taken from the water, after he had been ſome weeks in it, and was entire'y putrified. After opening his duodenum, two ligatures were made on that inteſtine, which was very much inflated, and from the aperture of which nothing was diſcharged, but a liquor which was chyle mixed with beer, of which the peaſant had, at a market, drank ſo liberally as to intoxicate himſelf.

The

The tumefaction of the ſtomach, laid a foundation for ſuſpecting that it contained a large quantity of water, though upon laying it open nothing was found but a pint of a liquor, whoſe ſmell exactly reſembled that of beer. The lungs were ſo much inflated, that when an inciſion was made in the breaſt they burſt out; but their inflation was ſpeedily diſpiſſated, by making an aperture in the *arteria trachæa*, thro' which the air was diſcharged with a conſiderable noiſe. In cutting the lungs into pieces, no extraordinary ſigns of humidity were perceived, nor were any preternatural circumſtances obſerved, except ſpots of different colours.

The third hiſtory is that of a woman drowned in a well, in whoſe inteſtines nothing but chyle was diſcovered, neither was there any water in the lungs. The inteſtines collapſed upon making a ſmall puncture in them, and an aperture being made in the arteria trachæa, the air eſcaped thro' it from the lungs with ſome noiſe.

The fourth and laſt hiſtory related by *Becker*, is that of a man who was found ſtanding upright in a baſon, where he had remained under water for five days. His ſtomach, which was large, was only inflated with wind, and hardly contained ſix ounces of a whitiſh liquor. The lungs being equally inflated, collapſed upon cutting the arteria trachæa, from which the air was diſcharged with a conſiderable noiſe. When he was found, two ſpoonfuls of water were not diſcharged from his mouth. "He was, however, con-
" tinues *Becker*, every where ſurrounded with water,
" but that element, notwithſtanding the minuteneſs of
" its parts, could not penetrate into the arteria tra-
" chæa and oeſophagus, in order to fill the cavities of
" the viſcera; an evident proof that theſe parts were
" ſo defended againſt every thing that made an attempt
" to enter them, that the water itſelf could not force
" a paſſage into them.

From theſe obſervations, the celebrated author concludes, that the abſence of water in the lungs and inteſtines, is not a proof that a perſon has been thrown

into the water after his death. This obſervation is of the laſt importance to thoſe whoſe buſineſs it is to make reports before courts of judicature, tho' it is contrary to that of *Rodericus à Caſtro*, adopted by many philologiſts and criminaliſts, and among others by *Feltman*, in *Tr. de Cadavero inſpiciendo*, cap. 21. But as, in the opinion of *Becker*, the lungs are not inflated in thoſe who are thrown into the water after death, ſo we may from their inflation draw a proof, that the perſon was alive when drowned, or put into the water.

Since, therefore, it is ſufficiently obvious, both from the ſtructure of the parts, and the authorities of the moſt penetrating anatomiſts, that little or no water enters the bodies of drowned perſons, ſo it is equally obvious, that the practice of hanging by the heels, is not only uſeleſs, but muſt alſo contribute to deſtroy thoſe remains of life which may poſſibly be loſt; for by ſuch a ſuſpenſion, the whole column of the blood conveyed to the heart by the inferior *vena cava*, will neceſſarily preſs upon that conveyed by the ſuperior *vena cava*, where the blood being interrupted in its courſe, muſt neceſſarily regurgitate into the jugular veins, and conſequently into the head, where, by its quantity and weight, it retards the motion of the ſpirits, whoſe free progreſs is abſolutely neceſſary to reſtore the circulation of the blood, on which life in a great meaſure depends.

As it is of great importance to know the cauſe of the inflation of drowned perſons, ſince it is not produced by the water they ſwallow, ſo the learned *Dethardingius* accounts for it in the following manner: "Thoſe, ſays he, who die in the water, are not de-
"ſtroyed for want of air, but by means of too large
"a quantity of it; they do not die in expiration, but
"in inſpiration; and, in a word, nothing more re-
"ſembles each inſpiration, than the phænomena ob-
"ſerved in drowned perſons; for if we attentively
"conſider what happens to ourſelves, we perceive
"that the breaſt is as it were lengthened, the abdo-
"men elevated, and the flanks inflated, and that this

"ſtate

" ſtate ſubſiſts, ſo long as we draw in the air, or re-
" tain it in the breaſt. Now the ſame things happen
" in drowned perſons, only with this difference,
" that in the latter, the inſpiration is performed with
" rapidity and violence, whereas in the former it is
" carried on quietly, and without any effort. In
" perſons not drowned, a depreſſion ſucceeds the ele-
" vation; but in drowned perſons, the elevation of
" the abdomen, and the elongation of the breaſt ſub-
" ſiſt; by which means, all the parts continue in a
" ſtate of expanſion. This is, no doubt, the mean-
" ing of thoſe, who look upon the death of drowned
" perſons as a ſuffocation, and pretend that the cauſe
" of it and that of ſtrangled perſons is the ſame; for
" thoſe two kinds of death have a great reſemblance
" and analogy, as is ſufficiently obvious from the ele-
" vation of the abdomen, which in hanged perſons
" ſubſiſts after their death."

From this theory it is ſufficiently eaſy to conceive, that the inflation of the lungs is the cauſe of the death of drowned perſons; accordingly *Dethardingius*, from the preceding doctrine, draws the following concluſions: " The veſicules of the lungs are inflated by the
" air, the bronchia are lengthened, the blood-veſſels
" diſtributed thro' the whole body of the lungs are
" compreſſed; and tho' the elongation of the bron-
" chia aſſiſts the entry of the blood into the large
" veſſels, as well thoſe proper to the lungs, as the
" bronchial artery and vein, as thoſe which are only
" ſubſervient to the circulation, as the pulmonary ar-
" tery and vein, yet the circulation is not carried on
" equally in the capillaries; ſince the preſence of a
" rarified air in the veſicules compreſſes the blood,
" and forcing it to ſtop there, hinders it from paſſing
" into the left ventricle of the heart, in order to ac-
" compliſh the circulation. Now as ſoon as there is
" a conſiderable retardation in this important func-
" tion, the vital motions alſo gradually ceaſe, and
" death approaches inſenſibly."

After

After having thus diſcovered the reaſon of the inflation of the lungs, and of the death which ſucceeds that circumſtance, we ſhall, with the ſame author, inveſtigate the cauſe which hinders the diſcharge of the air from the lungs and breaſt. This is by no means a topic of pure curioſity, ſince the aſſiſtance to be afforded to drowned perſons can be of no ſervice, except in ſo far as it is proper to remove thoſe obſtacles, which oppoſe and hinder the reſpective actions of the vital functions. Now *Dethardingius* and *Becker* pretend, that the *epiglottis* (which is a ſmall valve placed at the external entrance of the larynx, in order, by its covering the glottis, to hinder all ſolid or liquid bodies which may be put into the mouth, from deſcending into the canal of reſpiration) being exactly and ſtrongly applied over the glottis, proves the obſtacle to the diſcharge of the air from the lungs. Theſe authors alſo affirm, that ſuch a ſtrong and convulſive application of the epiglottis over the glottis, ariſes from a preternatural extenſion of the fibres of thoſe membranes of the larynx which cover the epiglottis. This preternatural extenſion they attribute to the violent inſpiration excited by fear, in perſons who run a riſk of being drowned. Thus the incomparable *Dethardingius* reaſons in the following manner: "If "in all kinds of dread and terror we obſerve, that "reſpiration is diſordered; that is to ſay, that inſpi-"ration is more quick, and laſts longer; and that, "on the contrary, expiration is intercepted, uncer-"tain and ſhort, it follows of courſe, that inſpiration "muſt be much more ſtrong, and the air attracted "in a far larger quantity, when a perſon perceives "that he is threaten'd with death by the water, which "muſt in a moment fill the ſpace which ought to be "occupied by the air."

It is pretty ſurpriſing that *Becker* and *Dethardingius* ſhould only reaſon conjecturally in this affair; ſince the diſſections they made of drowned perſons, might have enabled them by their eyes to judge of the diſpoſition of the *epiglottis* in theſe unfortunate creatures. But, be this as it will, certain it is that *Dethardingius*'s method

method of affording relief to drowned perſons is highly rational, and promiſes fair for reſtoring them to life. It conſiſts in four things, the firſt of which is, to place the body drawn from the water in a proper poſture and ſituation. The ſecond is to compreſs the abdomen, at the ſame time that frictions are making on the back. The third is, to excite an irritation in the throat; and the fourth, to make an inciſion in the *arteria trachæa*.

As for the ſituation of the perſon taken from the water, we have already ſhewn ſuſpenſion by the heels to be prejudicial, tho' *Becker* recommends it, becauſe he thinks the weight of the abdominal viſcera may thruſt the diaphragm into the breaſt, compreſs the lungs, and giving a greater ſpring to the air, make it act with ſuch an effort as to raiſe the *epiglottis*: But the judicious *Detbardingius*, ſenſible that this method is ſufficient to deſtroy reſpiration in perſons alive, abſolutely condemns it, and orders drowned people to be laid with their bodies ſo declining as that the head may be loweſt. Beſides, as he had obſerved that reſpiration is more difficultly performed on the belly, he directs drowned perſons to be laid on their backs, and a ſtrong compreſſion of the abdomen to be made, from the region of the pubes, as far up as the ſtomach. He adds, that it is expedient, both for the ſake of the frictions and the compreſſion, to rub the hands with ſome oil, proper to reſtore to the fibres rendered rigid by the cold and ſpaſms, that ſuppleneſs and pliant ſtate which is neceſſary to them in order to perform the motions of reſpiration.

Pechlinus obſerves, that in *Sweden* it is cuſtomary to uſe frictions on perſons taken out of the water, and externally to apply hot and ſpirituous remedies, in order to re animate the internal heat, and more effectually excite the efferveſcence of the blood. *Borelli*, in *Hiſt. Cent.* 2. *Obſ.* 11. orders the ſkin to be rendered red by means of frictions in a warm bed. Mr. *Joly*, a phyſician of *Britany*, in the obſervations inſerted in the Hiſtorical Journal, for the month of *November* 1743, adviſes frictions before a large fire with hot

hot cloths, with a view to reſtore the perſon to heat as ſoon as poſſible. *Dethardingius* orders theſe frictions to be made from the nape of the neck down to the buttock, becauſe the heads of the muſcles ſubſervient to expiration, are attached to the ſpine of the back, and their tendons to the ribs; and becauſe, in his opinion, friction facilitates the action of theſe muſcles, eſpecially when made with oils, which contribute to reſtore the pliancy of the fibres.

Beſides frictions before a fire, with hot cloths ſoaked in oils or ſpirituous liquors, are beneficial in another reſpect, becauſe the ſpine of the back is the origin of a great numbers of nerves, and conſequently of the various motions performed in the body. This cannot fail to put all the vital ſprings in action, by reſtoring ſuppleneſs to the nervous and muſcular fibres and motion to the ſlow circulating, or even totally coagulated juices. This is the reaſon why frictions and pumping ſo often prove ſucceſsful in apoplexies.

We muſt alſo obſerve, that *Dethardingius* approves of laying drowned perſons on their bellies over a hogſhead, or round veſſel, which is to be agitated, not with a view to make them diſcharge the water they have ſwallowed, but to ſhake and compreſs the abdomen, and thruſt its contents towards the diaphragm. But *Foreſtus*, in *Obſervat. Chirurg.* lib. 6. *Obſ.* 33. *& Obſ. Med.* lib. 15. *Obſ* 26. condemns this expedient as well as that of hanging by the heels; "becauſe, ſays he, it has produced ſudden death in "ſome perſons who could not bear the violent motion, "the turning the internal parts of the body topſy-"turvy, and the agitation of the head, and vomiting "produced by this means." Mr. *Joly* alſo condemns the putting drowned perſons in a hogſhead open at both ends, in order to be rolled for ſome time in different directions.

Dethardingius ſeems not to have laid great ſtreſs upon the *Swediſh* practice of defending the bodies of drowned perſons from the contact of the air, and of conveying them into warm places. The firſt ſtep, however,

however, taken by the *Swedes*, is, according to *Pechlinus*, to wrap ſuch bodies up in warm cloths. *Langelotti* alſo, in *Miſcel. Nat. Curioſ. An.* 6. *Obſ.* 20. informs us, that this method is among them univerſally put in practice, becauſe they have learned from long experience, that no drowned perſon recovers, if he is left long expoſed to the free air. Mr. *Joly* is alſo of opinion, that drowned perſons ſhould be left upon the ſhore no longer than is neceſſary to pull off their clothes, which may be cut off, for the ſake of expedition; for, continues he, a ſingle moment often determines between a ſtate of death or life." In conſequence of this principle, he adopts the *Swediſh* practice; " for, ſays he, when the drowned perſon's " clothes are taken off, he is to be wrapped up in " the warmeſt coverings or clothes which can be then " had; then he is to be convey'd to the neareſt houſe, " where, after frictions before a warm fire with hot " cloths, he is to be laid in a very warm bed. Great " care is to be taken to apply to his feet, the inner " ſides of his thighs, his houghs, and his arm pits, " flaggons full of boiling water wrapped up in linen " cloths." For the ſame purpoſe we may make uſe of bricks. I muſt, however, obſerve, that Mr. *Joly* recedes from the *Swediſh* practice, in a circumſtance which to me appears to be of the laſt importance; for the *Swedes* do not warm the bodies of drowned perſons ſuddenly, but by little and little, before a gentle fire. The expedience of this may be evinced by conſidering the effects of a too intenſe heat upon fiſhes found frozen in the winter time, which indeed recover for a moment, and then die irretrieveably. *Nymman* and *Ranchin* alſo ordered drowned perſons to be laid in warm places, eſpecially in winter.

As in drowned perſons, a defect of reſpirable air produces a ſuffocation, ſo it would be no leſs fooliſh, than barbarous, ſuddenly to expoſe them to the entire action of the atmoſphere, ſince that fluid entering precipitately into the thorax, would produce, in the pulmonary veſſels, a dilatation, which inſtead of promoting the paſſage of the blood thro' that organ, would

would produce a freſh obſtruction in it; becauſe the action of the heart is not ſtrong enough to ſurmount the reſiſtance which the air makes to the paſſage of the blood; and this muſt the more inevitably happen, becauſe the lungs in ſuch a ſtate collapſe, which is the unavoidable fate of all fibres deprived of the influx of the animal ſpirits, which neceſſarily depends on the free conveyance of the blood thro' the whole body, and the velocity of its circular motion. The precaution, therefore, of wrapping perſons taken from the water in blankets, is highly proper, and excellently ſuited not only to this ſpecies of ſuffocation, but alſo of all others.

But it is not ſufficient to guard drowned perſons againſt the rude impreſſions of the atmoſphere, ſince 'tis alſo requiſite they ſhould only be permitted the free uſe of that fluid by degrees.

As the decreaſe of the circulation is neceſſarily ſucceeded by a proportionable diminution of heat, ſo 'tis juſtly to be expected that the bodies of drowned perſons have loſt the greateſt part of that warmth, which is ſo neceſſary to the ſupport of life. Hence it is abſolutely requiſite they ſhould be warmed. But it would be equally pernicious, ſuddenly to expoſe them at once to the fire, or precipitately to exhibit medicines, which by the volatility of their principles, might produce a rarefaction of the blood. 'Tis, therefore, far more ſafe and prudent, to begin with gradually augmented frictions of the extremities with warm cloths, than all at once to expoſe ſuch perſons to the fire, or call in the aſſiſtance of hot and volatile medicines, both of which may be ſafely, tho' ſparingly and gradually uſed, when the circulation is ſo reſtored, that their bad effects are no longer to be feared.

Theſe precautions are founded on phyſical reaſons, which, tho' ſufficiently known to phyſicians, may yet afford freſh pleaſure and entertainment to readers of another claſs.

The

The blood, then, of the *vena cava*, diſcharges itſelf into the right auricle of the heart, whoſe contraction forces it into the right ventricle, which in its turn contracting itſelf, propels the blood into the pulmonary artery. That thoſe operations may be performed, it is neceſſary the quantity of blood diſcharg'd into the right auricle, ſhould not overpower its action; that the contractile force of the right ventricle ſhould be ſufficient to propel the blood in the pulmonary artery; and that in this artery there ſhould be nothing to obſtruct or oppoſe the diſtribution of the blood, which ought to be made in it. Now, according to this theory, the contractions of the right auricle and ventricle are, in ſuch caſes, extremely weakened, ſince theſe muſcles partake of the relaxation of the whole ſyſtem of the fibres. The lungs, alſo, collapſe, and conſequently oppoſe the free circulation of the blood, or its free diſtribution thro' themſelves.

If, therefore, in affording aſſiſtance to drowned perſons, we ſhould precipitately convey too quick a motion to the blood, we ſhould by that very circumſtance produce invincible obſtacles to its circulation, and conſequently make the means of recalling life ſubſervient to the production of irretrieveable death; for the exceſſive quantity of blood which enters the right auricle, will overpower and ſurmount the weak force which reſiſts it. Beſides, tho' this auricle had contractile force enough to convey the blood into the heart, yet the action of that muſcle will not be ſufficient to propel the blood into the lungs, or at leaſt to ſurmount the joint reſiſtance made by the collapſed ſtate of the lungs, and the air compreſſing their blood veſſels. Theſe methods, therefore, of relieving drowned perſons and reſtoring them to life, are not only founded upon the animal oeconomy, but are alſo abſolutely neceſſary and indiſpenſible.

'Tis, however, to be obſerved, that when the circulation begins to be carried on freely, we may, if ſuch practice is indicated by any preſſing circumſtances, attempt to reduce it to its natural ſtate, by means of cordials and anti-apoplectic medicines; though theſe,

eſpecially the latter, as being moſt powerful, are in the beginning to be uſed with the utmoſt caution; and probably the ſafeſt method is totally to abſtain from the anti apoplectic medicines, and to begin with the mildeſt cordials, whoſe moſt energetic parts being diluted in a large quantity of ſome proper vehicle, may more inſenſibly mix themſelves with the maſs of blood, and conſequently produce their effects more ſlowly. 'Tis, however, to be obſerved, that the ſame danger is not to be dreaded from the external uſe of the moſt efficacious remedies. Thus, for inſtance, we need not heſitate to apply topics to the temples, the noſtrils, the wriſts, the pit of the ſtomach, and all thoſe parts, where the arteries lying near the ſurface of the body are expoſed to their action and influence. And as the membranous parts are none of the leaſt conſiderable inſtruments of the ſeveral motions performed in the body, ſo a very particular regard ought to be had to them: Frictions, then, of the hands and feet, as well as the application of ſpirituous medicines to theſe parts, are extremely beneficial; for tho' the propriety of this practice could not be demonſtrated from anatomy and phyſiology, yet we might be fully convinced of it by the obſervation of *Deventer*, who orders frictions with bruſhes to be made on the ſoles of the feet of ſuch new born children, as diſcover no ſigns of life, in order to reſtore the circulation of the blood, which is the foundation or firſt beginning of it.

Deventer does not, indeed, adviſe the application of ſpirituous medicines to theſe parts; but as it is ſufficiently certain that theſe, as well as all other liquors, penetrate the ſurface of the body, and enter the cavities of the veſſels, ſo their external applications muſt neceſſarily produce very happy effects. Beſides, this method of uſing ſpirituous medicines, is of all others the ſafeſt, not only becauſe their mixture with the blood is not ſo quick as when they are exhibited internally, but alſo, becauſe the parts to which they are applied are moſt remote from the center.

But we now proceed to conſider the other methods of affording relief to drowned perſons, beginning with the ſmoke of tobacco, the happy effects of which are proved by various obſervations. Thus doctor *Mead*, in his mechanical account of poiſons, after mentioning that many who have been drowned, and dead to all appearance, have been ſurprizingly reſtored to life, ſpeaks in the following manner, from the memoirs of the royal academy of ſciences: "This circumſtance "ſhould certainly encourage the uſe of all means up- "on ſuch accidents, eſpecially as the trial is not dif- "ficult. The firſt ſtep ſhould be to blow the ſmoke "of tobacco up into the inteſtines, then to warm the "body by ſhaking and rolling about, and rubbing "it with warm cloths in a bed. In a word, to put "the blood into motion all manner of ways, and "not to be diſcouraged, tho' no ſigns of life ſhould "be diſcovered after an hour or two ſhould be ſpent "in this good work; towards the latter end of "which, ſpirits and volatile ſalts may produce a "good effect. Neither ſhould bleeding be omitted, "when the blood is become ſufficiently warm to drop "out of the veins."

The happy effects of the ſmoke of tobacco in reſtoring drowned perſons to life, are farther evinced from the following narration of Dr *Brubier*. Mr. *Thomas*, a profeſſed ſurgeon of *Paris*, being at *Paſſy*, waited in a boat till the number it was to take in ſhould be compleated. During this time, he ſaw a boat croſſing the river, and when it arrived at land, one of the paſſengers ſtepping aſhore, and miſſing his wife, aſked what was become of her; but no one could give him any anſwer, except a young child, who pointing to the river, ſaid, ſhe had hid herſelf in it. This woman had fallen from the ſtern of the boat, without being perceived by any of the paſſengers, except the child, who gave directions to row to the very part where the woman fell from the boat. The huſband finding her in a place which was not very deep, but full of mud, brought her to land, and laid her out. Whilſt ſome of the ſpectators of this

melancholy accident were adviſing to hang her by the heels, and others ordering different meaſures to be taken, a ſoldier, with his pipe in his mouth, came to aſk the reaſon of ſuch a concourſe of people; upon being informed of the accident, he deſired the diſconſolate huſband to give over weeping, becauſe his wife would return to life very ſoon. Then giving his pipe to the huſband, he bid him introduce the ſmall end of it into the anus, put a piece of paper perforated with a large number of holes upon its mouth, and thro' that blow the ſmoke of the tobacco into her inteſtines, as ſtrongly as he poſſibly could. Accordingly, at the fifth blaſt, a conſiderable rumbling in the woman's abdomen was heard, upon which ſhe diſcharged ſome water from her mouth, and in a moment after returned to life. This practice, however inſignificant in the eyes of the vulgar, is nevertheleſs of the higheſt importance; for the irritation of the inteſtines, excited by the heat and acrimony of the ſmoke of the tobacco, produces in the muſcles ſubſervient to expiration, ſuch a reflux of the animal ſpirits, as induces a contraction of them ſufficient to ſurmount that reſiſtance which the air contained in the breaſt found to its diſcharge. This happy effect of the ſmoke of tobacco is ſufficiently evinced by the preceding hiſtory, ſince it made the woman vomit up the water ſhe had ſwallowed. Now vomiting is excited by a ſtimulating contraction of the diaphragm, and of the tranſverſe muſcle of the abdomen, which contracting the ſtomach, force it to diſcharge its contents, where the leaſt reſiſtance is found, and conſequently by its ſuperior orifice. It is to be obſerved, that the ſame happy effects are produced by the ſmoke of all acrid ſubſtances, ſince Mr. *Joly* affirms, that the ſame end is equally anſwered by the ſmoke of ſage, and other plants of a ſimilar nature. It is alſo highly probable, that clyſters prepared of coloquintida or tobacco, would produce effects equally good; but on ſuch occaſions the moſt ready and expeditious meaſures are always to be taken, ſince a very ſmall delay

may

may prove of the laſt conſequence, by deſtroying a life which might otherwiſe be preſerved.

In caſes of emergence, where proper inſtruments are not immediately to be procured, the preſcription of the ſoldier, in the preceding hiſtory, may be followed; but it may loſe leſs time to cover the tobacco in the bole of the pipe, when lighted, with a ſilk handkerchief, either ſingle or once doubled, than to wait till proper holes are bored in a piece of paper, tho' this takes up very little time. However, that no neceſſary inſtructions might be wanted, I have given the figure of an inſtrument contrived on purpoſe for impelling the ſmoke of tobacco into the inteſtines. A repreſents a braſs or iron box, capable of containing half an ounce of the ſtrongeſt tobacco, which is to be lighted. B is a common clyſter-pipe, to be introduced into the *anus*, joined to the flexible tube D D made of leather. C is another pipe, at which a perſon blows forcibly, that the ſmoke of the tobacco in the box A may be impelled thro' the flexible tube D D and the pipe B into the inteſtines. E repreſents the ſmoke. If one clyſter is not ſufficient, another ſhould be given ſoon after, and repeated till it anſwers.

Theſe clyſters of the fume of tobacco are of excellent uſe in the iliac paſſion, and in an incarcerated hernia; and no apothecary or ſurgeon ought to be without ſuch an inſtrument.

As the olfactory nerves are of all others the moſt expoſed to the action of bodies, and have an intimate connection with thoſe ſubſervient to the motion of the muſcles deſtined for reſpiration, it muſt be of courſe beneficial to irritate the nerves of the noſe; ſo that what we call ſternutatories, or ſuch ſubſtances as excite ſneezing, produce happy effects in reſtoring drowned perſons to life: *Indian* marum or euphorbium introduced into the noſe, or reduced into a powder and blown up the noſtrils, will, in all probability, produce ſalutary effects, ſince if they operate they will excite a violent expiration, ſufficient to remove all thoſe obſtacles which the air finds to its free diſ-

charge. Mr. *Joly* warmly recommends this practice, as alſo injections of ſpirituous liquors. Thus the injection of ſpirit of ſal ammoniac into the noſtrils, operates more powerfully than holding volatile ſal ammoniac to them. Perhaps vinegar will ſtimulate yet more ſtrongly, and with better effect.

All thoſe authors who treat of the meaſures proper for reſtoring drowned perſons to life, order a vomiting to be excited, in order to procure a diſcharge of the water contained in the ſtomach. This is the doctrine of *Codronchus*, *Foreſtus*, *Camerarius* and Mr. *Joly*, who imagine that the water in the ſtomach of drowned perſons, is one of the cauſes of their death. In order to excite this vomiting, they order the throat to be tickled with the bearded end of a quill. *Becker* and *Dethardingius* order a feather to be introduced into the oeſophagus, in order to excite ſuch a motion of the epiglottis as is ſufficient to procure a diſcharge of the air contained in the breaſt. Now 'tis ſufficiently known to every body, that the bearded end of a quill excites vomiting. We muſt here obſerve, that Mr. *Joly* only orders vomiting to be procured after drowned perſons return to life. But it is certain that vomiting can produce no happy effects, if there is nothing in the ſtomach, or only a quantity of water equal to that daily uſed by moſt people. As for liquid emetics, their effects appear to be highly dubious, ſince the oeſophagus may poſſibly be in ſuch a convulſive ſtate as to hinder deglutition. *Dethardingius* looks upon this irritation of the throat as a circumſtance of the higheſt importance; but for exciting it prefers a certain inſtrument invented in *Germany*, and deſcribed by *Heiſter* in his ſurgery.

According to *Pechlinus*, the *Swedes* attempt to reſtore the lives of drowned perſons by means of fomentations, with anti apoplectic medicines, that is, ſuch as are of an hot and ſpirituous nature. *Borelli*, in *Obſ.* 11. *Cent.* 2. informs us, that he ſucceſsfully uſed toaſted bread ſoaked in warm brandy, applied to the region of the heart, and frequently renewed. *Nymman*, in *Tr. de Apoplexia*, cap. 44. orders us to apply

apply to the noſtrils of drowned perſons odoriferous ſubſtances, and ſuch as are capable of putting the ſpirits in motion, and reſtoring the action of the heart, and the functions of the brain. Of this kind are penny royal, rue, and lily of the valley, ſoaked in vinegar. He alſo orders us to apply to the region of the heart, epithems prepared of baum, rue, marjoram, amber, cinnamon and lavender. Thus, for inſtance:

Take of the beſt roſe water an ounce and an half; of baum water two ounces and an half; of roſemary-water one ounce; of malmſey wine one ounce and an half; of lemon juice one ounce; of the powder of cloves one ſcruple; of theriaca one dram, and of camphire and ſaffron each half a dram. Mix all together, and in the liquor ſoak a ſpunge, to be applied to the region of the heart.

As the genital parts of both ſexes have a near and intimate correſpondence with the heart, as is obvious from the effects of cordials applied to thoſe parts in ſyncopes, faintings, and other affections of the heart, ſo *Nymman*, in order to reſtore drowned perſons to life, orders thoſe parts to be fomented with warm wine, in which cinnamon, cloves, muſk and baum have been boiled.

But if any ſucceſs is to be expected from theſe remedies, it is principally when, by the aſſiſtance of frictions, the moſt volatile parts of ſpirituous liquors are made to penetrate into the maſs of the fluids; and it is highly probable that, independently of the experience of the *Swedes*, this method will anſwer the end propoſed by *Dethardingius*, which is, the procuring of a free expiration; for, if the admixture of the ſpirituous parts of cordial liquors reſtores the courſe of the ſpirits and blood, it muſt neceſſarily follow, that both muſt be more copiouſly conveyed to the muſcles deſtined for the purpoſes of expiration.

It is alſo certain, from experience, that one of the moſt efficacious expedients for reſtoring drowned perſons to life, is ſpeedy veneſection, eſpecially in thoſe parts moſt proper for relieving the head, as the ankles, for inſtance, and the jugular veins. The uſe of veneſection, in ſuch caſes, muſt be ſufficiently obvious to every one who conſiders, that drowned perſons, as well as thoſe who are hanged, die of an apoplexy of the ſanguineous kind, and not for want of reſpiration, or, as is commonly imagined, on account of a repletion, or choaking up of the breaſt by blood; for when ſuch perſons are laid open, the breaſt is found almoſt entirely void of blood, and the brain extremely inflamed; both which phænomena are highly agreeable to the laws of the circulation.

Theſe are the moſt common and approved methods of reſtoring drowned perſons to life; but if they ſhould happen to prove ineffectual, the laſt reſource is what we commonly call *bronchotomy*, or *tracheotomy*, which conſiſts in opening the *trachea*, in order to procure a free acceſs of the air to the lungs. This operation is principally intended to remove the obſtinate adherence of the epiglottis to the orifice of the glottis; in conſequence of which circumſtance, the air contained in the lungs is freely diſcharged. *Tracheotomy* was indeed originally intended for the extraction of foreign bodies from the *trachea*, or for the procuring an acceſs of the air to the lungs when the inflammation of the muſcles of the *larynx* is ſo conſiderable in quinſeys, as to cloſe up the aperture of the *glottis*.

Tracheotomy, according to *Dethardingius*, has all the advantages which can be wiſhed for, ſince it affords relief *ſpeedily*, *effectually* and *agreeably*: *Speedily*, becauſe there is no more expeditious method of procuring a diſcharge of the air, which by its natural ſpring, and by the continual compreſſion of the abdomen, muſt neceſſarily be evacuated in that manner. Now the air cannot eſcape from the pulmonary veſicules without their collapſing, and expreſſing into the pulmonary vein the blood which had entered the pulmonary artery,

tery, which cannot happen without adding a greater facility of circulation to the arterial blood. Now the blood arriving at the left auricle, and thence at the left ventricle, produces a new contraction of the heart, upon which the circulation is re-eſtabliſhed, and life diſcovers itſelf by manifeſt ſigns, eſpecially by reſpiration.

Tracheotomy, alſo, affords relief without danger, becauſe we are no longer afraid of making an inciſion in thoſe cartilages, which the ancients, in conſequence of their bony nature, imagined incapable of conſolidation. We no longer dread the hemorrhage, ſince only a few drops of blood are diſcharged in opening the membrane which unites the ringlets of the *arteria trachea*; and ſince there are not contiguous to that part ſuch large blood veſſels, as being wounded would produce terrible effects. There is no danger of injuring the voice by means of this operation, ſince the operator cannot hurt the muſcles of the larynx; and ſince there are no nerves, the dilaceration of which ſhould impair or deſtroy the ſenſation of the part. In a word, it is no difficult taſk to heal up and conſolidate the wound, for this is readily effected by means of a plaiſter, or ſome balſamic ointment.

Thirdly, *Tracheotomy* affords relief *agreeably*, for it cannot poſſibly be painful to a drowned perſon, whoſe ſenſes are ſo locked up, as to render him incapable of feeling pain. Thus the operation is performed, without being intercepted by the cries, the groans and motions which pain would produce.

Paulus Ægineta is the firſt author extant, who deſcribed the operation of *Bronchotomy*, from *Antyllus*. But the judicious and accurate *Heiſter*, in his ſurgery, deſcribes this operation very diſtinctly. The words *Bronchotomy*, ſays he, *Laryngotomy* and *Tracheotomy*, are convertible terms, and mean no more than an inciſion of the *aſperia arteria*, or what we commonly call the *wind-pipe*; and indeed various cauſes and circumſtances concur to render this operation abſolutely neceſſary on ſome occaſions; for, in the firſt place, it becomes principally and indiſpenſably ſo when in a quinſey,

quinſey, the fauces are ſo terribly inflamed, that the patient is in imminent danger of having his reſpiration quite ſtopped, and a total ſuffocation brought on. *Secondly*, It becomes neceſſary, when a bean, a prune, a cherry-ſtone, a pea, or any other extraneous ſubſtance, falls into the *aſperia arteria*, and ſeems to threaten a ſuffocation. *Thirdly*, The *aſperia arteria* is alſo to be opened, in ſuch perſons as have been ſuffocated, in conſequence of their being immerſed in water, or, as we commonly expreſs it, in newly drowned people; for reſpiration has been often reſtored to perſons in this condition by opening the *aſperia arteria*, and by that means procuring a free acceſs of the air to the lungs. I am ſufficiently apprized, that a great many forbid making an inciſion in the *aſperia arteria*, and conſequently condemn this operation, becauſe they think it productive of death, and are therefore prompted by an idle zeal, to brand the phyſicians who approve an operation ſo dangerous in their eyes, with the odious appellations of barbarous and inhuman, But the gentlemen, who are of this narrow and confined way of thinking, are groſsly miſtaken; for, in this operation, the ſmall inciſion made in the *aſperia arteria*, is ſo far from killing the patient, that it does not produce that effect when made conſiderably large; and *Garengeot* gives examples of various cures performed by this operation; ſo that we think ourſelves authoriſed with *Caſſerius*, in *Tr. de Vocis, Auditusq; Organis*, to pronounce thoſe men unſkilful, timorous and even cruel, who in the caſes now mentioned, fooliſhly neglecting this operation, which is not only ſafe, but alſo attended with the moſt ſpeedy and ſalutary effects, ſuffer the patients to die for want of this ſeaſonable aſſiſtance. Inſtances of this nature may be ſeen in *Nicolai Fontani Obſervat. Rarior. Analect.* and in *Caſſerius*.

When *Bronchotomy* is to be performed, that part of the *trachea* ſeems moſt proper for making the aperture in, which is ſituated between its ſecond and third cartilaginous *annuli*, or ringlets. The inciſion may, however, be made a little lower, without any danger.

The

The method of performing the operation, eſpecially when a foreign ſubſtance falling into the *aſperia arteria* and threatening a ſuffocation is to be extracted, is thus. The patient is firſt of all to be ſituated in a reclining poſture, either in bed or in ſome convenient chair, and his head is to be held firm by an aſſiſtant ſtanding behind his back: Then a longitudinal inciſion is to be made thro' the ſkin, fat and muſcles, from about two fingers breadth below the *cartilago thyroides*, or ſeutiformis, or the *pomum adami*, in the middle of the *trachea*, down to the very ſternum, ſo that the length of the inciſion may be two, three, and in tall patients, four fingers breadth in length.

Then an aſſiſtant is carefully to draw the lips of this orifice from each other, either with proper hooks, or with his fingers; and having abſorbed and wiped away the blood, either by a ſpunge or linen cloth, ſo that the *aſperia arteria* may be ſeen, three or four of the annuli or ringlefs of that ſpiral pipe are to be cut in ſuch a manner, that the inciſions made in the whole may form one continued line; and thus whatever ſubſtance may have ſlipped into it, is to be artfully and cautiouſly extracted, either by a probe, hook, or forceps. This being done, the wound is to be cleanſed with a ſpunge, and its lips being kept in contact by adheſive plaiſters, a proper compreſs and bandage are to be applied. It is afterwards to be carefully agglutinated by means of vulnerary balſams, as in other wounds of the *aſperia arteria*. By this very method, continues *Heiſter*, I myſelf, in *Helmſtadt*, happily extracted a piece of boiled muſhroom from a patient, who happening to laugh while he was ſupping broth, in which among other things there were muſhrooms, had the misfortune to have a piece of one of them ſlip into his *aſperia arteria*, by which means he was in danger of being ſuffocated. *Ravius*, continues *Heiſter*, alſo informed me, that by this very method he happily extracted a bean from the throat of a patient. Some, in order to induce a more ſpeedy and ſeemly cicatrix on the wound, recommend conglutination by future, as in the hare lip. But 'tis certainly abſurd

to

to follow a practice attended with ſo much pain to the patient, whilſt methods equally good, and at the ſame time far milder, may be purſued.

But in all caſes where a ſuffocation is either dreaded or actually preſent, *Tracheotomy* is abſolutely neceſſary, and may be performed in three different manners. In the firſt of theſe the patient is to be placed in a bed or chair, with his head reclined at the operator's diſcretion, and held firm by an aſſiſtant, as before directed. Then let the ſurgeon make an inciſion in that middle part of the throat, and in the ſame manner as before ordered, till he reaches the *trachea* itſelf, if he thinks proper; the ſkin on both ſides is to be laid hold of by the aſſiſtant, then it may be raiſed and cut longitudinally. After theſe meaſures are taken, the fat and muſcles lying above the *trachea* are to be cut. Some would have theſe muſcles firſt diſengaged from the *trachea*, or cautiouſly ſeparated from the others; but there is no occaſion for all this labour, ſince they may be cut ſafely and without any danger. Then the operator is to cleanſe the wound with a ſpunge wrung out of warm wine, or warm ſpirit of wine, for ſtopping the blood more effectually. The aſſiſtant is, in the mean time, to ſeparate and retract the lips, either by hooks or by his fingers. Then the ſurgeon is to paſs his knife between two of the annuli of the *trachea*, or he may even paſs it in ſuch a manner as to cut one of them, ſince by that means a ſilver or leaden pipe, either round or flat, furniſhed with *anſæ*, or a rim, ſo as to prevent its falling into the *trachea*, may be conveniently inſerted into the wound. But before the ſurgeon withdraws his knife, ſome proper probe ought to be inſerted in the wound, by the ſide of the knife, that by its aſſiſtance a pipe may be more commodiouſly and eaſily put into it. This pipe is fixed in the wound by means of a ligature paſſed thro' its annuli, or ſmall holes in the rim, and carried round the neck, as alſo by means of a perforated adheſive plaiſter: But great care is to be taken that the end of the pipe which is inſerted into the wound be not permitted to touch the poſterior

part

part of the *aſpera arteria*, leſt by this means a troubleſome cough ſhould be excited. But that the lungs may not be injured by external cold, or any filth falling upon them, it is highly proper to lay upon the pipe a ſponge, often impregnated with warm wine, and again wrung out; or, as *Garengeot* adviſes, a thin linen cloth, and afterwards a perforated plaiſter. Theſe directions being duly obſerved, blood is to be taken either from the veins of the neck or feet, thoſe under the tongue, or thoſe ſituated in the neck. When reſpiration is totally reſtored, which is moſt quickly diſcovered by ſtopping up the pipe with one finger, the pipe is to be taken out, and the wound agglutinated in the manner above directed. But when the difficulty of breathing at the mouth is conſiderable, the pipe is to be left for ſome time longer in the wound, and the other medicines continued.

Another and more expeditious method of opening the *trachea*, is this, a two-edged knife is applied to the above-mentioned part of the throat, and cautiouſly paſſed thro' the ſkin, fat and muſcles, into the cavity of the *trachea* itſelf, and a pipe is forthwith inſerted into the wound, and carefully ſecured in the manner before directed. This manner of operation is not only quicker, but alſo produces a ſmaller cicatrix than the former.

The third and laſt method of performing this operation is with an inſtrument called a *trocar*, uſed in tapping for the dropſy, which no ſurgeon ought to be without. This inſtrument applied to the middle of the *trachea*, may, as it were, at one thruſt, be paſſed thro' the ſkin, fat and muſcles, into its very cavity. Then taking out the perforating part, let the pipe remain in the orifice till the patient recovers. This method of operation ſeems, in one reſpect, to have the advantage of all the reſt, which is, that it is ſoon over, and the pipe at the ſame time introduced into the wound with far leſs pain to the patient than by any other method. But even in this caſe the ſame caution ought to be uſed, and the ſame directions followed, which we have above ſpecified.

If perſons drowned, continues *Heiſter*, are but juſt dead, their *aſpera arteria* is to be opened with all expedition, either with an inciſion knife, or any other inſtrument the ſurgeon ſhall judge proper. Then it is expedient ſtrongly to blow into the orifice, either with the naked mouth, or by means of a common pipe, the ſhank of which is to be introduced into the wound, whilſt the aſſiſtant blows into the bole. The learned *Bethardingius*, in a diſſertation on this very ſubject, informs us, that by this method if ſpeedily put in execution, life returns to the ſuffocated patient with the injected air, and that he is in a manner miraculouſly raiſed from the dead. For this reaſon the operation ſhould in ſuch caſes be performed with the greateſt haſte and expedition imaginable.

Mr. *Sharp*, our countryman, in his ſurgery, aſſures us, that this operation is abſolutely void of all danger, and deſcribes it in the following manner.

Bronchotomy is performed by making a longitudinal inciſion thro' the ſkin, three quarters of an inch long, between the third and fourth ringlets of the *trachea*, when the operator has his own choice of the place: It is always adviſed to pinch up the ſkin in this operation, which, however, may be left to the diſcretion of the ſurgeon, who, when the ſkin is cut thro' muſt make a ſmall tranſverſe inciſion into the wind-pipe, and immediately introduce a crooked *canula*, near half an inch long, of ſilver or lead, with a couple of little rings at the top of it, thro' which a ribband may be paſſed round the neck, to keep it fixed in the wound.

Some have preſcribed making an inciſion thro' the ſkin and *trachea* at once, with a lancet or knife, as the more eaſy and expeditious manner; and, ſays the author, I once ſaw it performed in this way, but it proved very inconvenient, for the wind pipe, in reſpiration, moving up and down, ſlipped from the orifice of the ſkin, and made it very difficult to introduce the canula, and afterwards maintain it in its ſituation. Wherefore I think it abſolutely neceſſary to make an external inciſion longitudinal, and even pretty large, as I have directed above.

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The caution of raiſing the ſternohyoidei and ſternothyroidei muſcles before opening the wind pipe is not to be regarded; and as to the diviſion of the recurrent nerves, and large blood-veſſels, ſo much dreaded in this operation, 'tis not in the leaſt to be feared, ſince they are quite out of the reach of the inſtrument, as any perſon ſkilled in the anatomy of theſe parts, muſt very well know.

The method of dreſſing is eaſily underſtood. ſince, after the patient can breathe by the natural paſſage. if we withdraw the pipe, the wound becomes a ſimple one, and notwithſtanding its penetration thro' a cartilage into a large cavity, requires only a ſuperficial application.

Upon the whole, it appears beyond all contradiction that *Bronchotomy* is a ſafe operation, and has been ſo often performed with ſucceſs, that no ſurgeon has any reaſon to heſitate in performing it, in caſes where particular circumſtances indicate its propriety. For this reaſon 'tis ſufficiently obvious, that this operation ought with all expedition to be performed on drowned perſons, many of whom have been happily reſtored to life by this very means. It is carefully to be obſerved, that this expedient is far more efficacious than blowing into a perſon's mouth, as is confirmed by the following experiment made by *Becker*. This phyſician hanged a dog. till no more motion of his heart was perceived, and having left him dead on the ground for half a quarter of an hour, he to no purpoſe blowed air into his throat. Then he performed the operation of *Bronchotomy*, and having thrice blown the air into his lungs, the breaſt of the dog began to elevate itſelf, and at the fifth blaſt he moved his feet. After this he was blooded in the throat, to give vent to the blood, and at laſt gave ſome howling barks, but ſurvived the accident for ſeveral years. Now as the cauſe of death is the ſame in drowned as in hanged animals, why ſhould not the ſame means reſtore them both to life?

I have been very particular with reſpect to the operation of *Bronchotomy*, becauſe it is of great importance, and of ſingular uſe in more caſes than one; and that

no one might be ignorant of the methods of performing it. In the caſe before us, that of drowned perſons, it may frequently be neceſſary, where no ſurgeon is to be procured ſoon enough to retrieve the misfortune and preſerve life; in this ſituation, as there is no great danger of injuring a perſon who appears to be dead, and muſt be abſolutely ſo without immediate relief, any common perſon, tho' not bred a ſurgeon, may, by theſe directions, be enabled to perform the operation, by making a perforation in the place above directed, with any ſharp pointed knife. Then inſtead of a canula or tube of metal, if that is not at hand, a tobacco-pipe may be broken about three quarters of an inch, or an inch. from the bole, and the part contiguous to the bole may be introduced into the perforation, taking care not to break it within the *trachea*; and then by blowing into the bole, the lungs may be inflated.

After having thus collected every thing of any importance upon the preſent ſubject, we muſt beg leave to obſerve, that tho', with reſpect to matters of religion and conſcience, it is not only extremely abſurd, but alſo highly cruel and barbarous, to invoke the aſſiſtance and interpoſition of the ſecular power: Yet in the preſent caſe, ſuch an attempt is ſo far from being either abſurd or barbarous, that it beſpeaks compaſſion and humanity; for we may ſafely appeal to experience, how many worthy members of ſociety, generous friends, affectionate huſbands, tender parents, and dutiful children, have in foreign countries been reſtored to life by theſe very means; whereas in *England*, perſons of equal worth, have, for want of proper care, been laid in their graves, at a time when they might, for many future years, have proved the common bleſſings of the various communities of which they were members.

This melancholy and deplorable conſideration, will ſufficiently authoriſe me to propoſe a regulation to the legiſlature of *England*, whoſe principal aim ſeems ultimately to terminate in the greateſt and moſt extenſive happineſs of the ſubject. It is, that this treatment of

perſons

perſons ſuppoſed to be drowned, may be enforced by all the authority of the law; and that no one may be ſuffered to be buried without it, and this under ſevere penalties; for otherwiſe, I am afraid theſe endeavours of mine, however well intended, will not have the deſired effect, nor be attended to, ſo much as the ſubject deſerves.

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APPENDIX

Concerning the methods of reſtoring hanged perſons to life, and children ſuppoſed to be born dead.

AS *England* is, above all other nations in the world, juſtly branded with *ſuicide*, commonly known by the name of ſelf murder, and as our countrymen frequently make choice of a rope for that purpoſe, we ſhall briefly point out the methods of reſtoring hanged perſons to life.

'Tis certain, then, that hanged perſons die of an apoplexy of the ſanguineous kind, produced by an obſtruction of the blood, by the rope, in the jugular veins, whilſt the arteries being freer from this compreſſion, continue to convey the blood to the brain. We may form a judgment of the effects produced by a compreſſion of the jugular veins, from the following paſſage of *Alexander Benedictus*, in *lib.* 2. *cap* 33. "When (ſays that judicious author) a redundance of "blood obſtructs the arterial and venous canals, and "intercepts the free circulation of the ſpirits, the "patient falls down in the ſame condition as if he "was hanged. The *Aſſyrians* ſometimes put found

" perſons into a ſimilar ſtate, when, for inſtance, " they intended to circumciſe adults or children. " Thus having laid them on their backs in a bath, " they compreſſed their jugular veins, ſo as ſpeedily " to produce a privation both of motion and ſenſati- " on ; and taking the advantage of this circumſtance, " cut off the prepuce with as much eaſe as if the pa- " tient was in an apoplexy. The ſame is the condi- " tion of thoſe who having attempted to hang them- " ſelves, are found ſuffocated, tho' their feet touch " the ground."

Nymman alſo, in *Tr. de Apoplexia, cap.* 14. declares his ſentiments on this ſubject in the following manner. " The functions of the brain, ſays he, are deſtroyed " without any leſion of the animal ſpirits and nerves, " as appears in a ſyncope. The like happens to " hanged perſons, who are no ſooner hung up, pro- " vided an expert executioner exactly brace up the " veſſels of the neck with the rope, than they become " immoveable as a log of wood, without even ſo " much as moving their feet ; notwithſtanding which " phænomena, the brain and origin of the nerves " ſuffer nothing in ſuch perſons, ſince thoſe parts are " defended by the cranium and vertebræ, which can " never be injured by the rope Nor is the inter- " ception of reſpiration to be accuſed as the cauſe of " death in hanged perſons, ſince tho' we cloſely ſhut " up the mouth and noſtrils of an animal, ſo as to " hinder the acceſs of air into the breaſt, yet as the " brain ſtill retains its vital ſpirit, it powerfully op- " poſes the imminent danger of a ſuffocation, by a " violent agitation of the body, and an exceſſive mo- " tion of the feet, which circumſtances are never ob- " ſerved in hang'd perſons."

From theſe authorities we evidently ſee the ſpeedy effects produced by the compreſſion of the jugular veins. This doctrine is farther illuſtrated by *Bartholin*, in *Cent.* 1. *Hiſt.* 32. " In diſſecting, ſays this " author, a man of a tall ſtature, of a ſanguine tempa- " rament, and vigorous conſtitution, who was hang'd " for a robbery, I found his lungs preternaturally

" large,

" large, bluiſh, ſtreaked with different colours, light " and ſpungeous, and ſo full of a frothy blood, that " every where on the membrane which covers them, " the veins not only appeared turgid, but the lobes " were alſo ſo large as to embarraſs me in diſſecting " the heart. The ventricules of the brain were full " of water, as alſo the origin of the nerves which " enter the ſpine. The *plexus choroides* alſo, beſides " the inflation of its veſſels, contained a great many " veſicules."

The loſs of knowledge in hanged perſons, alſo, proves the truth of this doctrine, and this loſs is ſufficiently atteſted by *Camerarius*, in *Cent.* 7. *Hiſt.* 40. where we are told, that a robber being hanged, and falling into the hands of the ſurgeons for diſſection, was nevertheleſs reſtored to life, notwithſtanding his mouth was full of froth, which is generally looked upon as an infallible ſign of irretrievable death, eſpecially where it continues long, as it did in the preſent caſe, and notwithſtanding he had before his execution, been ſeized with a fit of madneſs. When this man, however, was reſtored to life, he ſaid he remembered nothing of what had paſſed on that occaſion, except that he was conducted to the criminal chamber, after which he was inſenſible of every thing. This robber was hanged a ſecond time for committing freſh robberies; a convincing proof that he did not look upon the firſt as a formidable puniſhment. *Camerarius*, in *Hiſt.* 38. mentions another who was twice hanged; and in *Hiſt.* 39. another who was reſtored to life by the phyſicians of *Vienna*, after he had been hanged.

Lord *Bacon*, in his hiſtory of life and death, relates an accident, which, like that of *Camerarius*, proves the loſs of knowledge in hanged perſons. A young gentleman of ſome diſtinction, curious to know the pain ſuffered by hanged perſons, having fixed a rope about his neck, threw himſelf from a low ſtool, upon which he imagined he could eaſily put his feet again: But his attempts of this kind were in vain, and he had been irretrievably ſuffocated, without the aſſiſtance of a friend who had the curioſity to be preſent at

ſuch

ſuch an unaccountable experiment. Upon his recovery, his friend aſking him if he had felt any pain, he anſwered, that he had perceived none in any part of his body; but added, that at firſt he obſerved before his eyes a ſpecies of fire, or blazing light; then an extreme darkneſs, and laſt of all a pale blue, or a ſea green, like that which frequently preſents itſelf before the eyes of thoſe who fall into deliquiums. Lord *Bacon* ſubjoins, that he heard a phyſician of candour and worth aſſert, that he had reſtored life to a man who had been hanged half an hour, affirming, at the ſame time, that by proper means the ſame effect might be produced upon others, who had hung no longer, provided the effort of their firſt fall had not luxated the vertebræ of their necks.

After having thus diſcovered the cauſe of death in hanged perſons, we are the better able to form an eſtimate of the means moſt proper to reſtore them to life.

Frictions, then, and hot baths, by reſtoring the motion of the blood, and reſolving its coagulation, muſt for theſe very reaſons produce happy effects on hanged perſons. *Pechlinus*, in *Tr. de Aer. & Aliment. Defect. cap.* 7, relates an obſervation, which ſufficiently evinces the efficacy of ſal ammoniac on ſimilar occaſions. "I knew, ſays he, a woman hanged, who "after ſhe had remained for ſome time without pulſe "and reſpiration, with her lips covered with froth, "which is looked upon as an infallible ſign of the "total privation of life; and, in a word, after ſhe "appeared to be the neceſſary victim of death was "yet reſtored to life by a phyſician, who, coming "accidentally to the place where ſhe lay, made her "ſwallow a conſiderable quantity of the ſpirit of ſal "ammoniac."

As the activity of this acrid volatile liquor, and its propriety to reſolve coagulated blood, are ſufficiently known, it is by no means ſurpriſing that it ſhould, on ſimilar occaſions, produce ſuch happy effects. *Pechlinus* ſubjoins, "I don't in the leaſt doubt, but "if proper meaſures were taken in due time, a great

" many hanged perſons might be reſtored to life,
" even after thoſe who have an opportunity of ſeeing
" them, think they have all the reaſon in the world
" to conclude them really and irretrievably dead. This
" effect is moſt commodiouſly produced by reſtoring
" the circulation of their blood, by means of fric-
" tions, veneſections, and the exhibition of hot and
" ſpirituous remedies, or of ſome other analogous
" ſubſtances."

It is ſufficiently eaſy, from what we have before ſaid, to conceive, how excellently veneſection is calculated for reſtoring life to hanged perſons; and as for ſpirituous liquors, they act at once on the blood and veſſels, by attenuating the former, and reſtoring the proper ſpring and tone of the latter. The remedies of this kind are before ſpecified.

Schenkius, in *Obſervat. Art. de Suffocat. ex Laquea*, orders that drowned perſons ſhould be made to ſwallow vinegar and pepper; or oxymel mixed with the powder of penny royal. He alſo adviſes to excite a vomiting, by means of a feather dipped in oil, and to wrap up the patient's neck in a woollen cloth dipped in warm oil, eſpecially the oil of orris.

The virtues of oxymel, or of ſimple vinegar with pepper, are ſufficiently evinced by *Chriſtopherus de Vega, Art. Med. Lib.* 3. *Sect.* 5. *Cap.* 8. All phyſicians are ſufficiently apprized, that vinegar, moderately uſed, is a powerful reſolvent, whilſt pepper is an acrid ſubſtance, equally proper to diſſolve the coagulations of the juices, and re animate the fibres, by the irritation it produces in them. The powder of penny royal is, alſo, an acrid aromatic, whoſe effect muſt of courſe be nearly the ſame with that of pepper.

As for exciting a vomiting in hanged perſons, I think it more dangerous than in thoſe who are drowned; for the contractions of the muſcles ſubſervient to expiration, may ſerve to reſtore that function, as we have already obſerved, ſince the inflation of the abdomen and breaſt of hanged perſons, is a proof that their inſpiration is forced and unnatural; yet in ſuch circumſtances

circumſtances it ſeems dangerous to convey a greater quantity of blood to the head, which is before over-charged with it, as is ſufficiently obvious, not only from the preceding hiſtories, but alſo from the livid colour of the countenance. It is, however, certain, that the ſhocks given to the parts by means of the vomiting, are very proper to diſſolve the coagulations of the blood, tho' I would never adviſe the uſe of this method, till after a previous veneſection.

The topic mentioned above, which *Schenkius* orders to be applied to the neck, may produce very happy effects, by reſolving the blood collected in the ſkin and muſcles of the neck, and relaxing the parts which had ſuffered moſt immediately by the rope

Geſner, for a girl who hanged herſelf, ſucceſsfully ordered powder of caſtor, which he forced down in warm broth. This remedy is alſo of a volatile and reſolvent nature. *Joubert*, in *Lib.* 4. *de Effect. Thor. Cap.* 1. informs us, that he reſtored many hanged perſons to life, without ſuch a multiplicity of expedients; ſince he uſed no other method than veneſection, and forcing into their ſtomachs a due quantity of good wine.

Ranchinus, in *Tr. de Morb. ſubit. Cap.* 12. orders oil of orris, or of lilies, to be applied to the necks of hanged perſons, whilſt their mouths are to be gargarized with ſyrup of violets diſſolved in warm water, or barley water. He alſo preſcribes vomiting, excited by a feather, in order to enlarge the paſſages more. The ſame author alſo recommends pepper and penny-royal, either in vinegar, oxymel, wine, or the *aqua cæleſtis*. But veneſection is the expedient on which he depends moſt for happy effects. The oils and the ſyrup are only intended to procure a relaxation; and as for the gargariſm, it cannot be uſed till the hanged perſon is previouſly reſtored to life. The pepper, penny-royal, and other ſubſtances mentioned by him, are deſigned to re-animate and reſtore the natural heat.

Aelius,

Aelius, in *Tetrabibl. Serm.* 8 *Cap.* 49. orders us to add to the pepper and vinegar, nettle ſeeds, which are alſo of an highly acrid nature. The ſame author affirms, that when the redneſs round the necks of hang'd perſons is diſſipated, they open their eyes, and the parts are relaxed. He is alſo of opinion, that we ought not to ſpare fomentations of the neck, with warm oils, cerate, or woollen cloths.

Ranchinus, from other authors, greatly extols a remedy which moſt people will think as ſingular in itſelf as diſagreeable to the perſon who adminiſters it. It conſiſts of blowing into the mouth of hanged perſons, provided the adminiſtrator has in his own mouth a bruiſed nutmeg, cinnamon, cloves, or carraway ſeeds. As it is certain, that theſe aromatics produce no other effect, than impregnating the air with ſome volatile parts, proper to reſtore the motion of the fluids, ſo it is equally certain, that the principal efficacy of this practice depends upon the *blowing*, which in this caſe muſt infallibly produce ſalutary effects; as is obvious from the following experiments, recorded in Number 28 of the philoſophical tranſactions of the royal ſociety of *London*.

Firſt, then, Dr. *Croon*, profeſſor of *Greſham college*, in the preſence of the royal ſociety, ſtrangled a pullet, in ſuch a manner, as that it diſcovered no more ſigns of life; but by afterwards blowing into the *arteria trachæa*, he ſo effectually reſtored the motion of the lungs that the pullet returned to life.

Secondly, Dr. *Walter Needham*, in the preſence of Mr. *Boyle*, and other *literati*, hanged a dog till the motion of his heart was no longer to be perceived, after which he opened the abdomen of the dog, and blowing into the thoracic duct, reſtored the motion of the blood, upon which the heart began to beat, and the dog returned to life.

Thirdly, Dr. *Hook*, in the preſence of the royal ſociety, cut the ribs, the diaphragm, and pericardium of a dog, after which, making an inciſion in the ſuperior part of the *trachæa*, he introduced into it the pipe of a pair of bellows, then he blowed the air into the

the lungs, and the dog returned to life, but died when he ceaſed to blow: By which expedient he made him live and die alternately, as long as the company pleaſed.

A *fourth* experiment is that of *Becker*, by which he reſtored a hanged dog to life, by opening his larynx and blowing the air into his lungs, thro' the inciſion made; ſo that the practice enjoined by *Ranchinus* is by no means to be neglected.

Upon the whole, the firſt and fourth experiments are abſolutely the ſame with the practice recommended by that author. Now, why may not that which has ſucceeded twice, ſucceed oftener? Tho' the other experiments do not ſo directly prove the ſame truth, yet it may be eaſily deduced from them; for from the ſecond it follows, that the air is not only neceſſary to the circulation, becauſe by dilating the lungs it gives a free paſſage to the blood, from one ventricle of the heart to the other, but alſo is requiſite to keep the blood in ſuch a ſtate of ſolution as circulation requires. Now, by blowing air into the lungs, we inflate their veſicules, which is the firſt advantage produced by reſpiration; and the air, by this means inſinuating itſelf into the blood, reſolves its coagulation. By means of this explication, 'tis eaſy to comprehend how Dr. *Hook*'s experiment favours the doctrine of *Ranchinus*.

From what has been ſaid, we may therefore conclude, Firſt, that blowing into the mouths of hanged perſons is a proper method of reſtoring them to life; Secondly, That if this method does not ſucceed, we are to perform the operation of *Bronchotomy*, and by that means blow air into their lungs; Thirdly, That we ought not to be diſcouraged at ſome fruitleſs attempts, becauſe a practice which with *Becker*, did not ſucceed till the fifth time, may perhaps, in other circumſtances, not ſucceed till later; Fourthly, That we muſt not, at the ſame time, neglect theſe other means which have a tendency to reſtore the loſt fluidity of the blood; Fifthly, That if death does not ſucceed ſtrangulation, this is rather the effect of the ſtiffneſs

of

of the cartilages which compoſe the larynx, or, according to ſome, of the ſlackneſs of the rope, than of the eaſy diſpoſition of the blood to reſume its fluidity; Sixthly, That it is highly probable, that an efficacious method of reſtoring drowned perſons to life would be to inject air into the blood, by introducing a ſmall pipe into ſome of the larger veins, for that purpoſe: For what difference is there between making the air enter the blood by the thoracic duct, or by any other part. The only caution which I think ought to be given, is, to make choice of thoſe veins moſt contiguous to the heart; ſo that for this very reaſon, as well as for their largeneſs, and the facility of finding them, I judge the external jugulars moſt proper for this purpoſe.

Having already obſerved, that as the cauſe of death is the ſame in hanged and drowned perſons, ſo the meaſures taken for the relief of the one, may be alſo uſed for reſtoring the lives of the others. We proceed to give ſome hiſtories of facts, which prove the poſſibility of reſtoring ſuffocated people to life.

Mr. *Falconet*, then, a gentleman of ſtrict probity and candour, told Dr. *Bruhier*, That his father had a ſtout hardy coachman, who, falling into a quarrel at *Lyons*, killed a man, and being apprehended on the ſpot, was forthwith condemned to be hanged, which ſentence was accordingly put in execution. The ſurgeons of the town having obtained his body, in order to make a ſkeleton, brought it into a ſurgery, where they left it upon a table; but when they came next day to diſſect it, they were ſurpriſed to find the man not only alive, but in good health, and piſſing in the chimney, for want, as he ſaid, of a chamber-pot

This man had ſtood in no need of remedies, certainly, for no other reaſon, but becauſe the circulation of the blood had not been ſo long ſuppreſſed, but that it could of its own accord reſtore itſelf.

Oſwaldus Gabelchaverus relates, in one of his obſervations quoted by *Schenkius*, the hiſtory of a merchant of the name of *Landthtaler*, who was hanged

on a tree for ſome villanies he had committed: He hung for a whole hour, and the ſervants who had orders to inter him, having cut the rope, perceived, as they thought, ſome marks of life in him, upon which they put him in a cart, conveyed him to a proper place, and ſoon reſtored him to life. He afterwards uſed to ſay, that he was ſenſible of no pain in hanging, except in his eyes, and the extremeties of his toes. About eighteen years after, however, he began to follow the ſame practices, for which he had been hanged before, but prince *Charles* of *Aremberg* order'd him to be hanged a ſecond time, in ſuch a manner that he never returned to life.

Cæſarienſis, in *Illuſtr. Mirac. Lib.* 6. *Cap.* 24. relates the hiſtory of a certain robber, who had been hanged a little before a ſervant belonging to a canon of *Cologne* happened to come up to the gallows. The ſervant, imagining there were ſtill ſome remains of life left in him, cut the rope, and reſtored him to life, by ſome cold water taken from an adjacent rivulet. The robber, in the mean time, gradually reſuming his ſtrength, followed his deliverer, who was going to the next town; and juſt as they were talking with each other, the robber laid hold of the bridle of the ſervant's horſe, cried out aloud, that the horſe belonged to him, and ſwore that the ſervant had robbed him of him. This debate having drawn together a large concourſe of people, their indignation was ſo ſtrongly moved againſt the ſervant, that, without hearing what he had to ſay in his own juſtification, they were determined to drag him to the gallows from which he had lately cut down the robber; but, luckily for the ſervant, ſome inhabitants of the neighbouring town, ſeeing a concourſe of people going to the gallows, which belonged in common to both towns, came to ſee what the matter was; then the croud ſuffering the ſervant to ſpeak, he related his adventure, and the manner in which the robber had recompenced his ſervice. The robber being at laſt known, was a ſecond time hung upon the ſame gallows, in ſuch a manner as not to return to life.

Tho'

Tho' the ground-work of the following hiſtory reſembles the preceding, yet it differs from it in many circumſtances, the moſt conſiderable of which is, the long time the criminal continued hanged.

A miller near *Abbe ville*, in *France*, happening to go near the place where a robber had been hanged the day before, ſuſpected that he was not dead. Compaſſion having induced him to ſatisfy his ſuſpicion, which was well founded, he cut him down, laid him in a cart, conveyed him to his own houſe, and uſed ſuch effectual means to reſtore him to life, that in fifteen days the robber recovered perfect health. The miller, upon this, intended to give him a little money, and take his leave of him: but delaying for ſome time to put that intention in execution, he left him one *Sunday* alone in his houſe; the miſerable wretch, forgetting what he owed to his deliverer, broke open a cupboard, and carried off all the plate and ready money he could find. The miller, upon coming home and finding his houſe robbed, eaſily concluded, that his gueſt was the perſon who had done it; accordingly the miller, his two ſons, and a cart-driver, purſuing the robber, overtook him about a league off, and dragging him to the gallows, whence he had been cut down, hung him up a ſecond time, and gave him ſuch ſhocks, that they put it out of his power to commit any more robberies. It is about forty years ſince this accident happened, and doctor *Brubier* informs us, that it is atteſted by perſons of the beſt reputation in *France*; and a pardon was actually procured for the miller, his ſons, and ſervant, who took the liberty of executing the robber without legal authority.

Before we put an end to this treatiſe, which we intend for the common good and benefit of mankind, we ſhall ſay ſomething with reſpect to the methods of preſerving the lives of children, who appear dead when born. No two abuſes, then, are more prejudicial to ſociety, contrary to humanity, or inconſiſtent with reaſon, than to inter women big with child, without performing the *Cæſarian* operation upon them; and,

without any attempts of relief, totally to abandon children who ſeem to be born dead.

The former of theſe abuſes is founded on two errors, the firſt of which is, that the infants do not ſurvive their mothers, when they die near their time; and the ſecond, that the lives of children depend abſolutely on thoſe of their mothers. Now theſe two errors are deſtroyed by ſeveral hiſtories, which prove, that the death of the mother does not neceſſarily produce that of the child.

Caſpar Reies, then, in his *Campus Elyſius Jucundarum Queſtionum*, relates from *Cornarius*, " That a " woman of *Madrid*, of the illuſtrious houſe of *Laſſo*, " being reputed dead, after remaining three days in " the utmoſt agonies, was put into the tomb belonging to the family, which being opened ſome months " after, her corps was found, with an infant tenderly " graſped in her right arm; for, continues the author, " the woman was pregnant, and near her time, when " ſhe was interred as dead."

The following hiſtory is alſo related by the ſame author, and atteſted by ſome of the moſt learned and judicious men in *Spain*.

" The wife of *Francis Arevallo de Swaſſo*, fell ill " in the city of *Segovia*, during the laſt months of " geſtation: However, as ſhe died, or rather was taken for dead, in a few days ſhe was interred, ac- " cording to the cuſtom of the place. The huſband, " in the mean time, who was ſent for to a place at a " conſiderable diſtance, whither he had gone about " ſome buſineſs, came home about the middle of the " night, and being informed that his wife, whom he " loved to exceſs, was dead and buried, he would at " any rate have the ſatisfaction of ſeeing her once more: " For this purpoſe, he went to the church, and ordered " her to be raiſed from the grave; hardly was the " coffin opened till the cries of an infant were heard; " the by-ſtanders were aſtoniſhed, a juſtice was called, the prieſts and a great many others got flambeaus, and attended the huſband: The ſhroud was " lifted up immediately, upon which appeared the

head

" head of an infant, making a vigorous effort to diſ-
" engage the reſt of its body from the vagina. This
" infant was not only extracted, ſound, and alive, but
" alſo lived to be lieutenant general of the city of *Che-*
" *rez.* The ſurpriſing manner in which he came into
" the world, laid a foundation for his being called *the*
" *ſon of the earth.*"

From theſe hiſtories, *Caſpar Reies* draws the following conſequences. " 'Tis evident that children
" don't die with their mothers, when the latter die
" near the periods of their deliveries. *Sennertus* af-
" firms, not only that they live for ſome time after
" their mothers are dead, but alſo that we may, and
" even ought, to extract them alive from the uterus.
" *Vincelius* has compoſed two treatiſes in order to
" prove theſe truths, which are alſo ſufficiently eſta-
" bliſhed in the diſſertations of *Nymman*, *De Vita Fœ-*
" *tus in Utero*, where, as well as in other authors,
" we find a great many ſimilar hiſtories; and others
" of women who have been delivered of live children
" after their own death. The reader may alſo con-
" ſult *Raynaud de ortu Infantum contra naturam.*
" Hence 'tis obvious, that we ought not to be too
" raſh and precipitate in burying pregnant women
" who die near their times. I am not certain whe-
" ther theſe women were dead or alive at the time of
" their interment, tho' it appears evident from the
circumſtances, that the firſt was buried alive. For
" *Horſtius* proves from another fact, that dead wo-
" men may be delivered of children Thus he in-
" forms us, that a woman big with child being hang-
" ed along with her huſband, by the *Spaniſh* ſoldiers,
" between *Deventer* and *Zutphen*, was four hours after
" her death deliver'd of live twins."

Thomas Bartholin, in *Act. Hafn. An* 1673. relates an hiſtory which proves the ſame truth, and which is,
" That of a child born two days after the death of
" its mother, which happened in a labour, in which
" three midwives had employed all their art and ſkill.
" Thus 'tis certain, from experience, that dead wo-
" men may be delivered of live children, and this

" has

" has, perhaps, laid a foundation for the whimſical
" and ſuperſtitious practice of putting into the coffins
" of women, who die big with child, a needle, a
" thread, and a pair of ſciſſars, as if the *manes* ſtood
" in need of thoſe inſtruments, to tie and cut the um-
" bilical chord of the infant about to be born. In
" ſhort, it has been obſerved, that infants have been
" born in the coffins of their mothers.

The ſame author alſo mentions a woman who, in 1635, on *Thurſday* about nine o'clock at night, died of epileptic fits. On the *Friday* the foam was diſcharged from her mouth, cries reſembling thoſe of an infant were heard, and a ſenſible motion was obſerved in the abdomen of the mother. On *Saturday*, about ten o'clock in the morning, the woman diſcharged a great deal of blood, ſo that on changing her linen, her infant, ſtill warm, was found lying betwixt her thighs. *Bartholin* adds, that the phyſicians of the town were of opinion, that the mother had only died when her mouth became full of froth, without which circumſtance the infant could not probably have lived.

In the *Miſcellanea Naturæ Curioſ.* we have inſtances of women who have died near their time, and been delivered ſometimes of dead, ſometimes of live children, ſometimes one, two and three days after their deaths. Theſe inſtances are recorded by *Reſſer*, firſt phyſician to the prince of *Brieg*, in *Obſ.* 318. *An.* 3. By *Poliſius*, in *Obſ.* 42. *An.* 4. By *Doleus*, in *Decur.* 2. *An.* 5. *Obſ.* 137. By *Hoyer*, in *Decur.* 2. *An.* and laſtly by *Hartmanus*, in *Obſervat.* 83. of the ſame volume.

From what has been ſaid, 'tis ſufficiently obvious, that thoſe perſons are greatly miſtaken who ſuppoſe, that the *fœtus* does not ſurvive its mother; for it is evinced, from a number of obſervations, that the life of the *fœtus* is ſuſtained by a circulation peculiar to itſelf; that the umbilical arteries, which terminate in the placenta, convey thither a quantity of blood, which is carried back by the umbilical vein, without paſſing to the mother; and that, if this blood undergoes any change, it is only from a lymphatic or lacteal

eal liquor, which the roots of the placenta imbibe rom the uterine veſſels. Theſe truths are at preſent niverſally agreed upon; ſo that before the death of he mother can deſtroy the life of the child, 'tis neceſſary to prove, Firſt, That the lacteal liquor ceaſes o be filtrated immediately after the death of the mother: Secondly, That the ſuppreſſion of this filtration s an infallible or even neceſſary cauſe of death. In conſequence of this, we muſt prove, that at every irculation, the juices of the *fœtus* have their nutritive nd vivifying principles exhauſted; and that the *fœtus* s incapable of ſuſtaining in the uterus a degree of faſting, which it often ſupports for ſeveral days after it s brought into the world. Now, as theſe propoſitions cannot be proved, ſo it cannot be evinced, that the death of the mother is neceſſarily ſucceeded by that of the *fœtus*; ſo that 'tis certain, we commit manifeſt homicide by interring pregnant women near their time, without performing the *Cæſarean* operation upon them.

This is no new doctrine, ſince in the *Digeſt*, *Lib.* 4. *Tit.* 8. theſe words occur: "A royal edict prohibits "the interment of dead pregnant women, before we "have delivered them by means of the *Cæſarian* ope"ration. Thoſe who do otherwiſe appear to have "deſtroyed, with the pregnant woman, the hope of "obtaining a living man." It is highly to be lamented, that this law is not univerſally put in execution, ſince it is a principle founded on the eternal and unalterable nature of things, *That we kill thoſe whom we do not preſerve, when we have it in our power.*

If it ſhould be objected, that this operation would, if not always, yet at leaſt very often, prove an uſeleſs attempt. I anſwer, that it is an eaſy operation, ſince it is performed by two or three ſtrokes of the biſtory, and a few ſtitches of a needle. Beſides, tho' children after this operation ſhould appear dead, yet we are not to truſt to thoſe appearances, unleſs putrefaction ſhould remove all doubt.

Bhonius

Bhonius informs us, that the faculty of medicine at *Wurtemburg* being conſulted, in a criminal proceſs raiſed againſt a mother for killing her own child, anſwered, That children were ſometimes born ſo weak, as to appear for a conſiderable time without ſenſation, motion, and reſpiration; and that it was neceſſary to uſe vellications, fomentations, aſperſions of wine, ſpirits of wine, or *aqua vitæ*; as alſo to make them ſwallow aromatic liquors, or blow ſpirituous liquors into their mouths and noſtrils, till they begin to cry, which is an infallible mark that the air has entered the lungs.

As to theſe meaſures, we have before ſhewn, that they have an evident tendency to reſtore life. But we muſt not here paſs over a practice which, of all others ſeems to be of the greateſt importance to ſtill born children, which is, the ſucking the left nipple of the dead fœtus. This method, as we are told in *Ephemerid. Natur. Curioſ. Dec.* 2. *An.* 5. proved ſucceſsful, after vellications, frictions, ſpirituous liquors, and other methods had been tried in vain. Various other inſtances of the ſucceſs of this practice are found in the ſame work, and in the writings of other practical authors. Tho' this method may at firſt ſeem ridiculous, yet it will appear of the laſt importance to the anatomiſt, who knows the ſenſibility of the breaſt, all whoſe nerves center in the nipple. *Hannemaun*, alſo, orders a ſponge dipped in red wine, or *aqua vitæ*, to be applied to the left breaſt and pit of the ſtomach of ſtill born children. *Heiſter*, when ſpeaking of ſuch new-born children as are exceſſively weak, or hardly appear to be alive, orders a robuſt, ſound man to breathe into their mouths, immediately after he has drank a dram of brandy.

The laſt method of reſtoring ſtill-born children to life, is to blow into their mouths, as is obvious from various well-atteſted obſervations, with two of which we ſhall put a period to this work.

Borelli, in *Hiſt. Cent.* 3. *Obſ.* 58. relates, that a ſervant returning from the fields, and finding his maſter, whom he greatly loved, lying dead, he embraced

him

him for a long time, and by accidentally breathing in his mouth, gradually reſtored him to life.

The learned *Grubelius*, in *Miſcellan. Nat. Curioſ. Dec.* 2. *An.* 10. *Obſ.* 44. informs us, that whilſt a phyſician was preparing the remedies proper to reſtore to life a woman, who had fallen into ſuch a *ſyncope* that ſhe was thought dead, her own ſervant, who had a great attachment to her, reſtored her to life by blowing in her mouth But 'tis probable, that this method produces its happy effects: rather by reſtoring the motion of the blood and lungs, than by means of that vivifying principle, which ſome ſuperſtitious authors ſuppoſe to be lodged in the human breath.

F I N I S.